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DETERMINANTS OF PATIENT'S SATISFACTION AND PREDICTING PATIENT'S WILLINGNESS TO RETURN: A CASE FROM A CHINESE TOWN HOSPITAL

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Abstract of master's thesis

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Abstract

As the amount of hospitals increases drastically in China and the need for high quality medical care keeps rising, awareness has been raised for hospitals to maintain their standards by being aligned with national requirements as well as to continuously improve their service for patients. It has been estimated that nearly 75% of clinical cases are not properly diagnosed, treated or supervised afterwards in many developing countries.

Because different patients have various needs or requests for medical service, it can be extremely tough for hospitals to satisfy every patient. In order to increase satisfaction level, it is essential to measure patients' satisfaction not only in favor of the overall experience of patients, but also of hospital itself such as better presentation, more patient's visits and better reputation. Patients' satisfaction can be referred as patients' feedback towards various aspects of their subjective dimensions of experience. With the results from patients, hospitals are able to identify which need to be improved, and then make corresponding decisions in pursuit for better services and quality based on patients' desires.

The purpose of the thesis is to discover the significant determinants influencing patients' satisfaction and to predict the willingness to return in the case hospital. The case hospital in Shahu central hospital. In this thesis, I will mainly focus on the determinants related to the case hospital and demographical predictors. Regarding determinants concerning the case hospital, they include the level of care, tangibles, price, accessibility and corruption level, which are partially based on SERVQUAL model. Furthermore, the demographical predictors are comprised of gender, age, education level, socio-economic status and health conditions. In order to implement the research, a questionnaire is distributed to patients visiting the case hospital. Results are then analyzed with python using various models: regression analysis, Pearson correlation, decision tree and random forest.

The results indicate that price, tangibles, accessibility, the level of professional care and interpersonal care and patients' health conditions are of great significant to patients' satisfaction level in the case hospital. Besides, price is negatively associated with patients' satisfaction level, while other significant predictors show positive relationship with patients' satisfaction level.

Keywords patients' satisfaction, Chinese health care system, SERVQUAL framework, regression analysis, decision tree, random forest, Pearson correlation

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1 Introduction

1.1 Background

As the amount of hospitals increases dramatically and the need for medical care rises in China, it is highly vital for hospitals to keep up their standards align with national requirements and to continuously improve their service for patients. Several researches conducted in a few developing countries indicate that nearly 75% of clinical cases are not properly diagnosed, treated or supervised afterwards (Peabody et al, 2006). It might be disputed that the most significant underlying reason is due to the lack of resources in developing countries, however, it is shown by a study that low satisfaction level is received although enormous investment has been placed and on-site facilities are overall satisfactory (Bahrampour & Zoala, 2005).

Since the majority of patients tend to have specific needs or requests for medical service, it is extremely difficult for hospitals to satisfy every single patient without thoroughly knowing their needs. In order to accomplish that, the necessity for measuring patients' satisfaction emerges not only in favor of the overall experience of patients, but also of the all kinds of benefits hospitals will have such as better presentation, leaner management, better reputation and etc. Patients' satisfaction can be further referred as the feedback towards various aspects of their subjective dimensions of experience (Pascoe, 1983). Besides, it is also a universally used indicator for evaluating the quality of hospitals as patients play a significant role in contributing the quality improvement process. With the results, hospitals are able to identify which parts needed improvements and make comprehensive decisions in pursuit for better services and quality based on patients' desires (Alhashem et al, 2011).

Despite the fact that this topic has been discussed by numerous studies, it is still relatively tough to determine what actually affects patients' satisfaction level as it is subject to personal feelings. Besides, the multi-dimensional nature of it containing different kinds of aspects makes it even harder for hospitals to measure. From the perspective of hospitals, the results might vary between public and private ones. Furthermore, hospitals in different areas: e.g., urban and rural areas can have significantly diverse outcomes. From the perspective of patients, specifically, gender difference, occupation, age and other determinants all have impacts on how patients perceive the service that they receive from hospitals: older patients and patients with lower social-economic status are easier to be

satisfied. Moreover, it is found that patients with poor health status might have extreme feelings regarding satisfaction level towards hospitals (Hall & Dornan, 1990). Nevertheless, there are other research disputing that demographical determinants are not significant for affecting patients' satisfaction level.

Furthermore, most of the previous studies only focus on how patients' rate the service of hospitals without adequately understanding the underlying problems and nature of services. It is noted that patients' actual experience need to be depicted in the survey and measured instead of ratings to prevent above problems (Cleary et al, 1992). Therefore, in this paper, a comprehensive method will be utilized to explore the significant determinants of patients' satisfaction level towards the case hospital in China. Unlike some of the previous studies, attention will be paid to find the underlying problems from the management and facility perspective. Besides, more determinants will be included in this paper in order to achieve more precise and comprehensive results.

1.2 Research Problems

The major goal of this thesis is to find out the significant determinants of patients' satisfaction level based on the data from a case town hospital in China as well as to predict the probability of patients' returning to the hospital. Although many previous studies have conducted deep research about the topic in general for hospitals in western countries, literature on cases of Chinese town hospital is extremely limited, because the health care system is completely different in China, and the existence of Chinese specific factors, such as high corruption and bureaucracy, reduce the likelihood for researchers to produce integrate and accurate findings. Therefore, best attempts will be made in this thesis in pursuit for authentic and inclusive results.

Regarding the theoretical part of this thesis, previous literature related this topic would be utilized to find out the common factors of patients' satisfaction level regardless of regions. Because this thesis is conducted for a case hospital in China, more emphasis will be put on the case and country specific factors.

Based on the above considerations, the main research question is proposed:

- What are the significant determinants of patients' satisfaction for the case hospital?
- What are the predictors of patients' willingness to return to the case hospital?

In addition, I also propose the following research questions:

1. Does Chinese specific determinant exert greater impacts than other common determinants on patients 'satisfaction?
2. What could be improved in order to enhance patients' experience in the case hospital as well as to increase their satisfaction?

1.3 Overview of the case hospital

The thesis will use Shahu Central Hospital, a middle-sized Chinese town hospital, as the case hospital for further analysis. Shahu Central Hospital was established in 1954 by the government of XianTao city and was later ranked as the first tier public hospital in the city. Regarding the location and size, it is located in the rural area of Xiantao city and consists of approximately 50 employees. It offers both in-patient and outpatient services incorporated with emergency service. Besides, it comprises various departments, such as internal medicine, surgical department, gynaecology, paediatrics and etc. The average number of patients per day is around 200, which was measured in the early 2019.

The reason why it is selected is that my father is currently running this hospital, which suffers the problem of not having enough customers, patients not coming back again as well as patients occasionally giving the negative feedback of the overall clinical experience. Thereby, in order to help tackle this dilemma, I propose to my father that I can use my analytical skills to find out what the determinants of patients' satisfaction are and what actions could be done correspondingly to improve the overall situation.

1.4 Structure

In the latter part of the thesis, the content will be separated into two major chapters. The first chapter of this thesis will focus on previous literature on how this topic is discussed by other scholars, including a general introduction of the current Chinese health care system and reviews of previous explorations on possible determinants of patients' satisfaction level. Besides, a conceptual model will be built based on previous findings and situation of the case hospital.

Afterwards, the second chapter mainly looks into the empirical part of this thesis, which targets to find out the significant determinants of patients' satisfaction level towards the case hospital. Specifically, the methodology used in this thesis will be presented,

followed by questionnaire design, data collection process. The responses from the survey will be then evaluated by various models to produce the best results. Based on the results, findings and discussions will be delivered. Lastly, this thesis will conclude with main findings, managerial implications, limitations and suggestions for further research.

2 Literature Review

2.1 The Chinese health care insurance system

Although noteworthy progress has been made for reinforcing Chinese health care system, the current system still encounters severable problems ahead. In history, the Chinese health care system has been reformed several times in order to adapt to the rapid economic growth rate, increasing need for better health care and the diminishing number of poor citizens (Xi et al, 2017). The major change was made in 1990s after the collapse of the old health care system, leaving millions of citizens without health care. However, the government has put enormous efforts in constructing a new health care system, which consists of three main methods for urban and rural areas. This system ensures that at least 90% of the population has easy access to hospital resources and costs have been significantly deducted. Nonetheless, there is still a major gap between urban and rural areas regarding the hospitals resources and insurance coverage due to the large difference in salaries and living conditions (Edoardo, 2015).

During the reform, it is notable that the power of the government was considerably diminished and the local authorities were primarily in charge of financing and supervising the health care sectors in different provinces. Besides, as the fiscal support for public hospitals was reduced in the reform, more hospitals start to use unmoral ways to make more profits by increasing the price of drugs, collecting extra cash from patients(also known as "Red Pocket" in Chinese term) and etc., which significantly devastates patients' clinical experience and reputation of those hospitals (Blumental & Hsiao, 2005).

Inspired by the reforms in 1990s, the current health care system still follows the fundamental principle of the old one, dividing the beneficiaries into two major groups: urban residents and rural residents, while the latter segment constitutes nearly 55% of the total population (National economy and society development annual report, 2008). The primary reason for this is the existence of large discrepancy on annual incomes between rural and urban residents, putting rural residents in a vulnerable position. With less income, they are not able to visit better hospitals or afford expensive checks if they have poor health status. Furthermore, usually in rural areas, health resources are relatively scarce, leading to the result that rural residents have less options towards hospitals and therefore their bargaining power is extremely poor (Brown et al, 2012). Thus, with the aim to narrow the gap, the government decides to subsidize more for rural residents.

In general, the current health care system in relatively complicated, consisting of three main systems: Urban Employee Basic Medical Insurance (UEBMI), Urban Residents Basic Medical Insurance (URBMI) and New Rural Cooperative Medical Schem (NRCMS) (Sun et al, 2017). The three systems are introduced in consideration of the health resources in different areas and gap between rich and poor.

2.1.1 Urban Employee Basic Medical Insurance (UEBMI)

Urban Employee Basic Medical Insurance was firstly introduced in 1998 by the government. The scheme requires both employers and employees to pay a certain percentage of employees' gross income as health care insurance (Liang & Langenbrunner, 2013). Before the introduction, the government was providing free health care to urban employees, however, as more and more residents moved to urban areas, the government quickly realized that it is a massive burden. Therefore, a reform commenced, and this system was introduced to ease the pressure on the current government and enterprises (Blumental & Hsiao, 2015).

Having been adjusted for a few times, the current UEBMI system necessitates the enterprises to pay 6% of income and employees to pay 2% instead, with the exception of retired employees since they have already contributed to the premium for a certain amount of years (Liu et al, 2016). However, the premium will not flow directly to the employees' account; instead, it is separated into two main channels: individual medical savings account and the social pooling account, while the latter takes up 70% of the total premium. Specifically, the individual medical savings account is intended for covering outpatient, emergency service and medicine fees while social pooling account is used to pay for inpatient expenses (Edoardo, 2015).

As the urban residents start to realize the benefits of this scheme, the number of residents who enroll to the program begins to increase rapidly from 5% of the total urban population in 1998 to 65% in 2007. Besides, the premium has reached to approximately 222 billion Chinese yuan including social pooling accounts and individual accounts (Dong, 2009). Nowadays, this scheme exerts significant effects on how urban employees in China finance their medical fees.

2.1.2 Urban Residence Basic Medical Insurance (URBMI)

Although UEBMI scheme has covered a considerable number of urban residents regarding health care insurance, there are still a minority of urban residents left uninsured such as unemployed residents and children (under 18). Thus, launched in 2009, Urban Residence Basic Medical was introduced to ensure that those minorities are covered by the scheme as well (Liang & Langenbrunner, 2013). One of the major targets of the initiative is to aid unemployed urban residents and children who suffer from chronical or severe diseases.

Due to the fact that majority of the beneficiaries have unstable incomes and low social-economic status, the government decides to aid them by paying a larger percent of the premium, while the rest is paid by the individuals (Yip et al, 2012). In the case of children, the parents will pay the premiums instead. The current scheme is applicable for both outpatient and inpatient services reimbursements including medicine expenses. Furthermore, for disabled residents, infants and family with poverty, the government will provide additional subsidy, and the amount is determined by the beneficiary's current situation (Edoardo, 2015).

2.1.3 New Rural Cooperative Medical Scheme (NRCMS)

Rural population, in China, takes up a relatively larger part in Chinese total population compared to urban population. Despite the fact that the number of rural populations is constantly decreasing, as vast majority of them move to urban areas where there are more opportunities, high living standards and health resources, there are still a considerable number of residents living in rural regions (Smith et al, 2005) . Forty years ago, it was very difficult for rural residents to access health resources, and even if they had the chance, they were not able to afford the rather high expenses. Furthermore, since the education resources were not that well abundant, most of the rural residents were not aware of the importance of keeping them healthy by washing their hands regularly, prevent from touching dirty surfaces and so on. Thereby, it is relatively easy for diseases to spread and the lethal rate is considerably high in rural areas, taking SARS outbreak as an example (Edoardo, 2015). As a result, the government issued the old scheme to enhance the health care system in rural areas, called rural cooperative medical insurance (RCMS).

The current scheme for rural residents is NRCMS, which was officially introduced in 2006 and created based on RCMS. Like URBMI, both government and individuals contribute to the premium, to which the central and local governments pay a larger

percentage, while the individuals' contribution is limited. The coverage of the scheme ranges from inpatient services to outpatient services in addition to medicine fees (Sun et al, 2017). Besides, it has to be noted that it is a voluntary program, indicating that not every rural resident must be enrolled to the scheme. With the purpose to promote the scheme, the government allows counties, towns and villages to have their own customized scheme, meaning that the local governments are very flexible in implementing the schemes by for example, increasing the subsidy ratio and reimbursement ratio. Furthermore, the personal contributions will directly flow into the individual accounts instead of social pooling accounts in urban scheme. This measure has maximized the welfare and successfully increased the enrollment number among rural residents (Dong, 2009). The statistics show that around 90% of the rural population is registered in scheme and benefited from it (China health care statistics, 2008)

Nevertheless, it is disputed that the current scheme is not providing enough help to those poor rural residents by Liu et al (2014). The current practice is that patients have to pay the medical fees beforehand and after that, a certain percentage of those expenses will be reimbursed. Therefore, for some residents in extreme poverty, the current scheme is not offering any substantial benefits to them, as they do not have enough deposits at hand to pay for the medical fees (Lei & Lin, 2009).

2.1.4 Commercial Health Insurance and Insurance for employees in government related organizations

Apart from the three mainstream insurance schemes mentioned above, there are some other insurance types. One of them is the Commercial health insurance, which is very pervasive world widely. Apparently, for rich family and individuals, the current social insurance scheme is not enough for them. Therefore, they usually purchase the Commercial health insurance as a supplement in case the occurrence of major incidents and severe diseases. Commercial health insurance has higher reimbursement ratio and premiums, and the individuals need to pay a relatively higher price for that compared to social insurance scheme. Nonetheless, it does not halt people to purchase Commercial health insurance. Typically, urban residents are more willing to pay for Commercial health insurance than rural residents are, since their financial situations are much better.

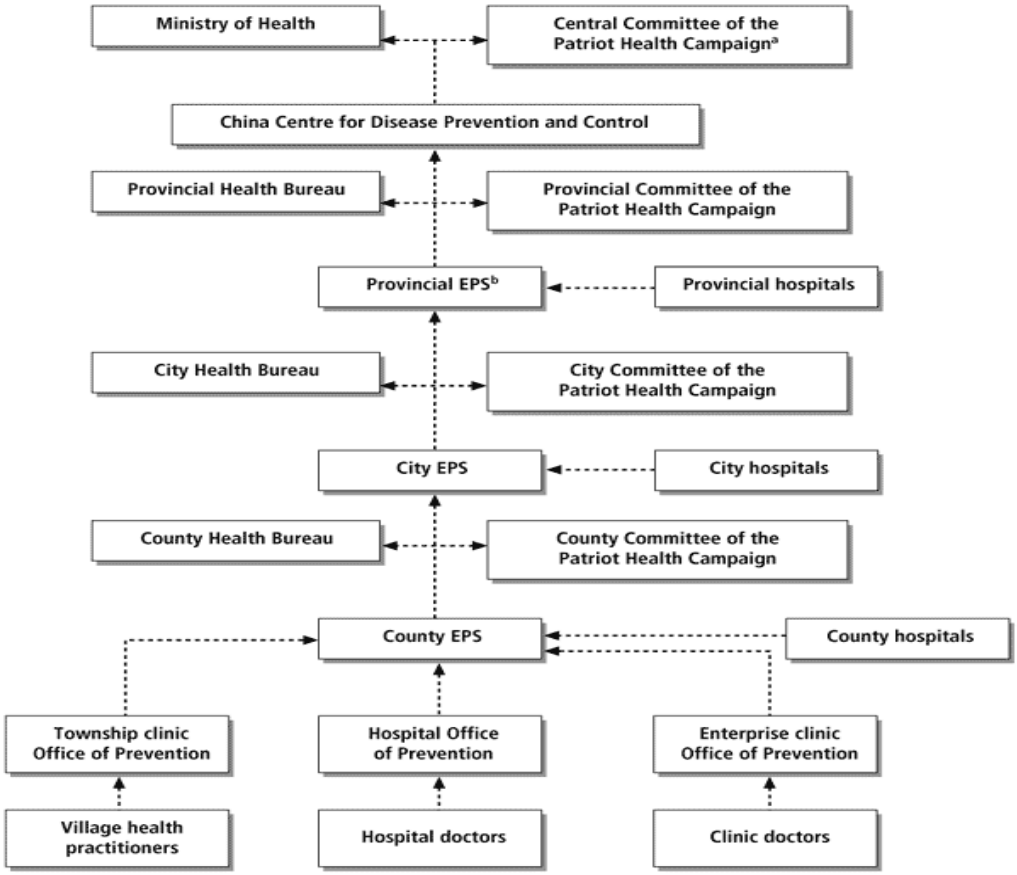
Regarding the other insurance scheme, it is specifically targeted to employees working in the government related organizations, including local and central governments,

educational institutions, the army, NGOs, public sectors and so on. Generally, for these employees, they are fully insured by the scheme, indicating that they do not need to contribute to the health care premiums and the government pays for the healthcare fees. However, it does not mean that all the health care expenses will be reimbursed by the government, as there is a cap for the total amount. If exceeding the cap, then the individuals have to pay for themselves (Jens et al, 2012). Apparently, it is somewhat unfair to other employees and numerous disputes for this issue have been taken place. It is argued that why the employees working in government related organizations can be provided with this superior welfare, broadening the gap between them and normal residents. To tackle this, the government decides to gradually change the current scheme and apply a new system similar to UEBMI.

2.2 The basic structure of Chinese health care delivery system

To provide a more comprehensive overview of the current Chinese health care delivery system, figure 1 is provided below to illustrate the hierarchy and detailed structure. Generally, the current health care system in China is supervised by two entities simultaneously: the government and the professional health units. While all the professional health units are under the government's control. Therefore, the entire structure is a mixture of horizontal and vertical management (Shi, 1993). Moreover, the overall Chinese health care system can be categorized into two basic segments: Urban and Rural segments. In urban segment, there are provincial and city level hospitals. Whereas in rural segment, it can be simply illustrated by a three-layer model, including county, township and village health units. As the name indicates, those health units are located in counties, towns and villages with limited health resources (Tao & Wang, 1992).

Figure 1: An overview of Chinese health care system



The Ministry of Health is evidently at the top of the whole structure. Being supervised by the state council, The Ministry of Health exerts direct and great power to all the subsidiary units. Besides, it is also in charge of the financial resources from the government, and it has direct control of allocating the funds to different medical institutions, schools and so on (Hillier & Shen, 1996).

After the Ministry of Health, what comes next is the Provincial Health Bureau, which is directly controlled by the provincial governments and in charge of approximately 700 provincial hospitals. In China, there are 34 provinces including autonomous regions, thus, the management style of each province and health resources are completely different (Shi, 1993). Provincial Health Bureau is mainly accountable for activities related to maternal and infant's health. Furthermore, the regulations and standards made by higher authorities: The Ministry of Health, need to be properly maintained and regularly monitored by Provincial Health Bureau.

The City Health Bureau is under the control of governments in different cities, which sum up to 666 in total in China. At this level, the City Health Bureau only focuses on

fragmented activities and smoothly regulating the subsidiaries, such as how to properly allocate resources to various health units, provide basic trainings to executives and so on. (Hillier & Shen, 1996).

After the introduction of the urban health unit's system: Provincial and City Health Bureau, the remaining two levels are rural specific. Likewise, county governments regulate the County Health Bureau, and there are roughly 2862 counties in total. Unlike the urban system, County Health Bureau is also in charge of the traditional Chinese medicine hospitals (Hillier & Shen, 1996). Furthermore, the personnel in County hospitals are more experienced and professional. The medical equipment is also more advanced and wide-ranging compared to lower level hospitals. In poorer districts of China: towns and villages, the health resources are even scarcer. The average size of town hospitals includes around 50 doctors and nurses; however, the number might vary slightly depending on the population and prosperity level of the town. Besides, the education and training level of the doctors and nurses there is not as high as those in urban areas; usually, they graduate from vocational schools and receive limited trainings.

Village clinics, at the bottom of the entire structure, is the major source for residents in those villages to receive treatment. Typically, the size of the clinics is relatively small and there are usually less than five doctors since those clinics are located in remote areas. The Village Clinics in general only provide very basic service, consisting of regular medicine prescription, illness consultation and Intravenous therapy (Fang, 2016). Besides, when village residents are in critical situation and in need of surgery, Village Clinics is not able to provide any help and they are usually transferred to the upper level: county hospitals or city hospitals, but it can take several hours, and the expenses can be relatively high.

In general, the above three levels: village clinics, town and county hospitals form the basic health care system in rural areas. In spite of the large amount of health care units in rural areas (nearly 700,000 units), the quality and level of care is far from enough since most of the doctors and nurses are not professional enough and the medical equipment is extremely inadequate (Cheng, 2012). As mentioned previously, the patients are typically transferred to upper level hospitals in case health care units at the bottom segment are not able to handle the situation. The transfer process is, however, time consuming and cost unfriendly to patients from rural areas. Therefore, the satisfaction level is rather low in hospitals residing in rural areas.

In contrast, in urban districts, not only the amount of hospitals is enormous, but also the quality of the medical equipment, health care service, doctors and nurses is relatively

higher. Besides, urban residents have a wide range of choices for hospitals and insurance types. If patients are not satisfied with one particular hospital, they can immediately switch to another one with limited additional costs. Furthermore, it is extremely convenient and less time consuming for urban residents to switch hospitals due to better infrastructure in cities. As a result, the patients there are more likely to give positive feedback to urban hospitals. Moreover, the urban hospitals care about their reputation and how patients review them since if bad reviews are given to them, their reputation will be damaged, and thus less customers will visit the hospital.

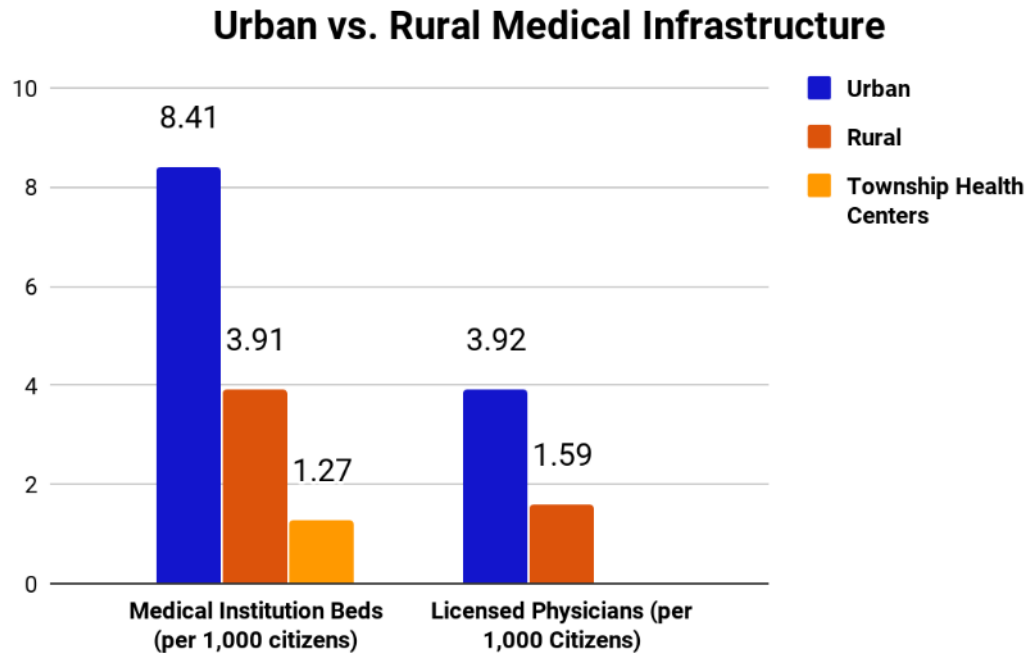
2.3 The existing problems of health care system in China

Although the health care system has been evolving and improving in China during the past 50 years, there are still some underlying problems ahead waiting to be tackled in the near future. Especially in village areas, the health insurance scheme there is very elementary, and some of them are still not able to afford the basic health care. Also, health resources are not evenly distributed between urban and rural areas, however, situations are changing gradually as the government starts to pay special attention to rural areas' development (Winnie and William, 2008). In the following part, several major problems related to Chinese health care system will be presented and analyzed.

2.3.1 Unequal health resources

Similar to the income gap between urban and rural residents, the gap of health resources in urban and rural areas is undoubtedly huge. As can been seen in Figure 2, the medical institution beds in urban areas per 1000 citizens are nearly double the total amount in rural areas including township health centers. Besides, the number of licensed physicians is as twice as that of in rural hospitals. From these figures presented, it can be inferred that in remote areas: towns and villages, residents there have restricted access to better hospitals with comprehensive infrastructure. It also explains the fact that more and more rural residents are relocating to urban areas where the living standards are significantly higher.

Figure 2: Medical institution beds per 1K citizens in China



As the major problem in the current Chinese health care system, it is not simply caused by the ignorance by the government. Because most hospitals are profit-oriented, the health resources allocation is correspondingly affected by patients' demand and ability to pay. Consequently, hospitals with more patients will have more and better medical equipment in order to attract more customers as a matter of course. It is a fact that rural residents have relatively lower incomes and health expenses are largely subsidized by the government, so, hospitals in rural areas do not have enough resources to develop and the local government are more likely to neglect them (Hsiao, 1995).

From the perspective of government, decades ago, in order to develop urban areas intensively for attracting local and foreign investment, the government decided to shift the majority of resources to urban areas, leaving the infrastructure in rural areas undeveloped, containing health care resources. The decision was extremely devastating to rural residents at that time, since they were having a hard time making a living. Being aware of the problem, nowadays, government begins to put more investment in developing rural areas and equalizing the health resources, however, the gap is too large to be fixed in such a short time.

2.3.2 Inefficiency

Inefficiency is also considered as a core cause for upsetting and annoying patients apart from the uneven allocation of health resources. In some hospitals, the staff could be unprofessional at work, referring that they are not fully dedicated to the work, and the resources also might not be utilized properly and thoroughly. For instance, in urban hospitals, the medical institution beds are occupied by a patient for a long period, which is estimated to be around eight days. Typically, some hospitals will implicitly suggest patients to stay at the hospital several days before the official operation due to poor schedule planning.

Specifically, since patients usually need to take several laboratory tests before the actual surgery, laboratory staff are somewhat lazy to schedule the appointments, which further explains the problem of inefficiency. Besides, hospitals can generate more profits by having patients staying for a few more days, which in result leads to the dissatisfaction of patients (Hsiao, 1995). Furthermore, in some rural hospitals, it is common that patients can wait for hours for laboratory tests as the limited resources of medical equipment; yet, it is less likely for outpatient and inpatient departments to share medical equipment when they could have done so (Wei, 1993).

It needs to be noted that hospital personnel are not the only ones to blame. The fundamental reason is the unorganized and incentive-based structure of hospitals in China. Commonly, the main director of hospitals only concerns about whether there are enough patients' visits in the hospital and if the revenues are able to cover the organizational expenses. Because the local government sets the requirement for each public hospital, the director has to make sure that they meet the requirement monthly. Besides, when more revenues are generated, the surplus will not be given to the director nor the hospital personnel (Hsiao, 1995). Consequently, the hospital personnel are not motivated to improve efficiency, optimize scheduling as well as to enhance patients' satisfaction levels; instead, they just need to ensure that basic requirements have been met.

Furthermore, aside from time management, resources allocation and limited incentives, excessive waste produced by hospitals cannot be neglected, which can also be a part of inefficiency of the overall health care system. There has been research pointing out that the majority of patients enrolled in insurance scheme pay for more expensive medicine when they have the choice for lower ones. For uninsured patients, the average cost for medicine is almost the half (Xiang, 1988). The underlying reason for this is that hospitals

can make profits by prescribing medicine that is more expensive for patients in the insurance scheme. While, for patients with no insurance, hospitals will not get any brokerage for the medicine sold in pharmacy. It has been found that most of hospitals' revenues come from medicine sales by prescribing expensive drugs (Xung, 1990). In rural districts, since doctors in village areas tend to have fewer incomes compared to those in urban areas, they utilize the loophole to prescribe expensive and extra medicine for patients in order to make more profits, which in turn deteriorates rural residents' living standards.

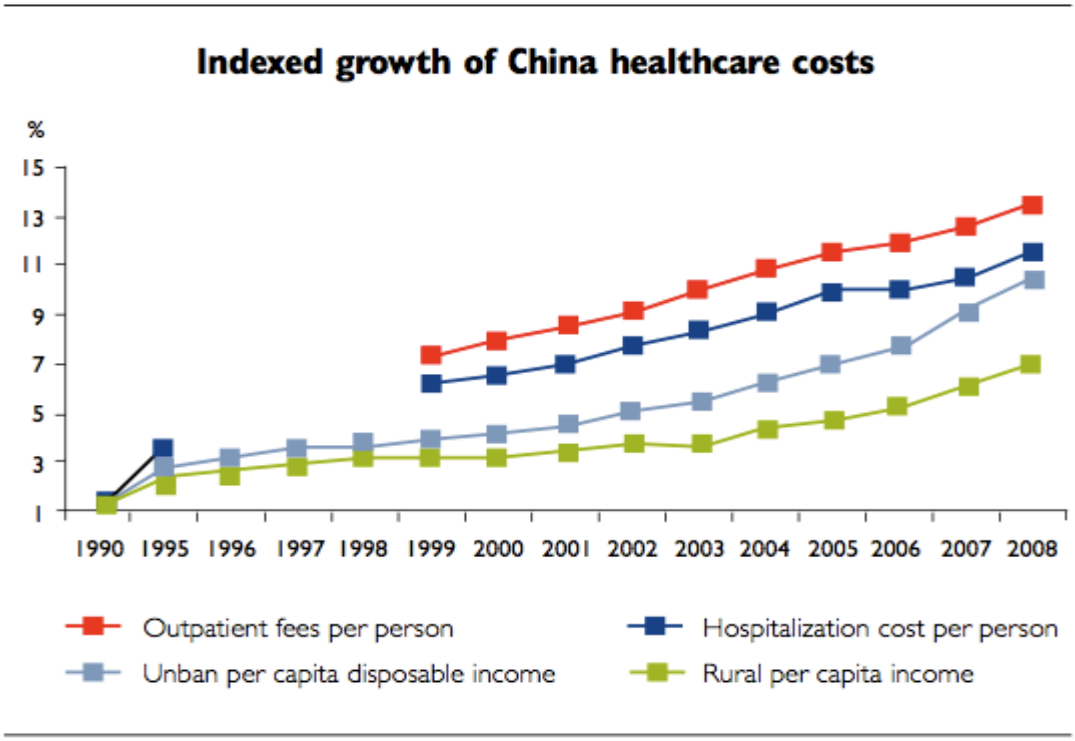
Another common problem for hospitals in rural areas regarding inefficiency is the low occupancy rate. With more investment put into rural areas by the government, the number and size of health units has been increasing drastically, which evidently should be a constructive progress. However, the population in rural areas keeps decreasing recently due to the urbanization trend. As a result, most of the hospitals in rural areas do not have enough patients' visits and the average occupancy rate for hospital beds is around 45 %, which does not even reach the half (Chinese Yearbook of Health, 1990). It can be indicated that nearly half of the hospital personnel are redundant. However, the director does not have the power to lay them off. Obviously, with redundant employees and low utilization rate of hospital beds, most hospitals operate on huge deficit and are constantly receiving support from the local government.

2.3.3 High costs for health care

Although the government is gradually improving the insurance scheme by increasing the reimbursement ratio and cap, the health care costs increase so rapidly that argument on reforming the current insurance scheme has been brought up by many people. As mentioned previously, the health care providers' profit seeking nature, enormous amount of waste and inefficiency at hospitals have led to the depraved situation nowadays.

As can be seen in the below chart (Figure 3), the outpatient fees have increased 6% from 1999 to 2008, while the average disposable income have risen 6 % and 3 % for urban and rural residents respectively. Meanwhile, in-patient costs have increased by 4% in average, since in-patient service is subsidized more by the insurance scheme. As a result, rural residents are less able to afford the health care service, widening the gap between urban and rural residents significantly.

Figure 3: Rising healthcare costs in China



Regarding the financial structure of public hospitals in China, typically, the government will subsidize hospitals by paying the salaries for hospital personnel. Besides, the revenues earned from services provided to patients will be at hospitals' dispose. Usually, those revenues will be used to purchase new equipment, renovating the hospital as well as to be distributed to hospital personnel as bonus at the end of the year. It is noteworthy that the price for service in hospitals is determined by the government and the government controls the price below the cost, enabling poor residents to have easy access to health service in general (Winnie and William, 2008).

Despite the fact that the policy has benefited residents in poverty, some hospitals begin to suffer from low revenues and as a result, they have hard time sustaining themselves. In order to tackle this issue, the government decides to adjust the policy, which increases the prices for high-tech services and permits hospitals to earn profit on the sales of medicine, but the maximum profit margin is 15 % (Winnie and William, 2008). After the change of policy, numerous hospitals start to utilize the policy in order to gain maximum profits. The most common method is to prescribe expensive medicine and to recommend high costs service to patients. For example, antibiotics are prescribed to patients who simply catches a cold in most cases and over 70 % of the patients stay in hospital beds for more than seven days, which is considerably higher than other countries (Zhou, 2008).

Furthermore, in urban areas where there are specialists and sophisticated doctors, patients usually have to wait for a long time to get an appointment. Inspired by the phenomenon, some people start to sell those appointment slots at a high price to whoever in need of immediate diagnosis and treatment. Although it is not prohibited in the law, it is morally wrong and criticized by the public seriously. In addition, patients will give those specialists "red pocket" in secret in exchange for an appointment slot (also known as bribery). However, bribery is illegal in China and the government is trying to monitor these actions intensively. Hospital personnel who are found out to have accepted bribe from patients will be penalized and even dismissed on the issue of valuables (Liu & Mills, 1999). Nevertheless, the severe punishment does not fully eliminate the phenomenon and it is somewhat permeating in rural areas particularly due to the poor supervision. In general, these actions have severely affected normal residents' access to health care services. The constantly rising health costs can be partially explained by the above phenomenon.

2.3.4 Fragmented health care system

One substantial deficiency existing in the current health care system is the fragmentation of services. In fact, not all the health care institutions are operated by the local government. Some of them can be actually owned by military institutions, enterprises, individuals and so on. It is extremely common for hospitals and private clinics to compete with each other by all means. Private clinic may outperform hospitals by offering fast and customized services but with a higher price. Public health institutions are better at providing reliable and affordable services.

Occasioned by the dispersive administration, those hospitals rarely share information and cooperate with each other (Winnie and William, 2008). Hence, this dilemma generates a giant information gap between hospitals, leading to extra burden for patients. Specifically, when patients switch to another hospital, their previous test records and diagnosis history is not recognized by the current hospital. Thereby, patients need to redo those tests, which incurs additional expenses to them.

Furthermore, in the case where the government is like to collect statistical information on new diseases from health care institutions, it can be hard for the government to receive precise and trustworthy results. Considering the policy that health care institutions are not responsible for reporting statistics on new diseases, some hospitals will simply do not report them when the government needs that information in order to keep a decent track of those

new diseases (Liu, 2004). If under the same supervision, it will be much easier and convenient for the government to collect information and statistics on those emerging infectious diseases. Regarding the reasons why health institutions refuse to report the statistics on new infectious diseases, first, releasing the information might panic the public in general. Local residents could consider that their health status would be impaired or threatened and it might diminish the willingness of tourists to visit the city as well. Second, hospitals' reputation could be hurt and patients' visits to those hospitals are likely to drop significantly since they are worried that they would get infected by visiting the hospital in case of airborne diseases. Consequently, it is exceptionally hard for the government to facilitate information sharing among health care institutions.

Moreover, the fragmented health care system further deteriorates the problem of portability. Due to the rapid development of urban areas in China, the number of rural residents coming to work and live in urban cities is rising quickly. According to Jeremy & Bob (2012), the urban population increases from 20% in 1980 to more than 50 % in 2011, which is a giant leap. Whereas, the rural population witness a substantial drop from 80% to 49 % in 30 years.

When rural residents come to urban cities, they are still enrolled in the NRCMS scheme, and under which, it is challenging for them to get reimbursement since NRCMS is only applicable for rural residents. It might be argued that they could just change to the urban health insurance scheme. However, it is not possible for most of the people, because their 'Hukou' is in rural areas, meaning that they originally come from rural areas. Factually, 'Hukou' is very hard to change in China and the requirements for changing 'Hukou' is terrifically harsh. Usually only less than 5% of the applicants can get 'Hukou' in large cities. The reason is that the government wants to control the population in urban areas in order to prevent crowdedness and high utilization rate of resources (Dong, 2009). Hence, rural residents moving to urban cities have great burdens on affording high medical expenses.

On the other hand, in a situation where urban residents move to another province or rural areas, they are confronted with the similar dilemma. In different provinces, the reimbursement rate and list of services that can be reimbursed are utterly distinct. Succinctly, having multiple insurance schemes and decentralized information database further weakens the performance of the health care system in China, which in turn adversely affects patients' satisfaction level to hospitals (Dong, 2009).

2.4 Patients' Satisfaction

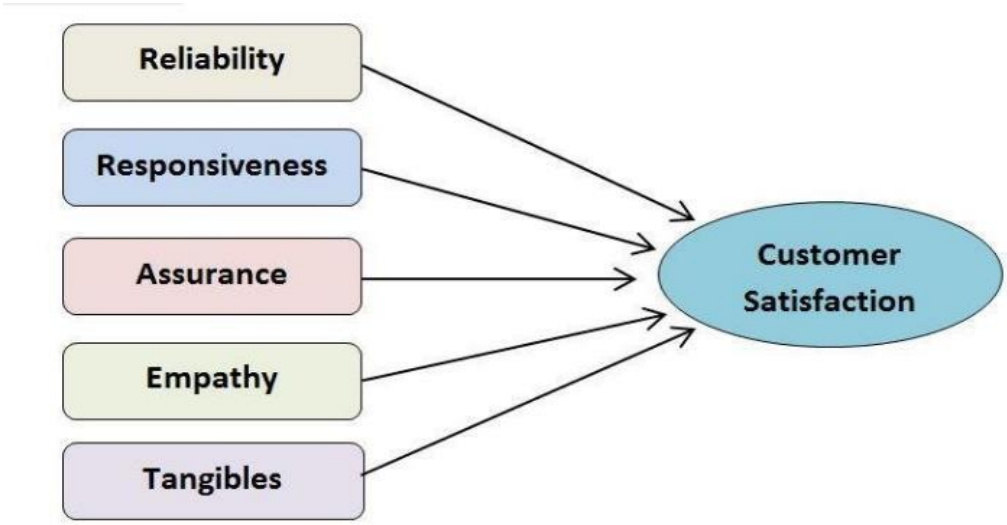
Earlier research points out that satisfaction is perceived as the state of content after experiencing a service (Churchill & Suprenant, 1992). However, Sixam et al. (1998) argues that satisfaction is significantly correlated with expectations prior to the experience. When actual experience matches with or even exceeds expectations, satisfaction level will rise; instead, while failing to fulfil expectations, satisfaction level will decrease correspondingly. Thus, satisfaction can be perceived as an effective measurement to certain service and experience.

Futhermore, it is brought up by Kotler (2003) that satisfaction can be deemed as an individual's emotional state of pleasure or discontent by comparing a service's perceived performance to his/her own expectations. It indicates that satisfaction is an outcome of the mixture of cognitive and affective appraisal, where the individual sets the baseline for comparison and then compares to the actual performance of the service/product.

It is noted that patients' satisfaction levels are affected by a vast number of determinants according to various old studies. Peprah (2014) further highlights several specific factors that will exert significant influences on patients' satisfaction level: the professionalism of hospital personnel, the competence to provide prompt service, the ability of communicating with patients patiently and smoothly, the accessibility of the hospital and the overall equipment that the hospital owns.

In order to present a more comprehensive model for evaluating service quality, SERVQUAL model (Parasuramen et al, 1985) was designed in late 1980s. This model comprises five elements: Reliability, Assurance, Tangibles, Empathy and Responsiveness. Specifically, reliability refers to the capability of delivering promised service properly and accurately. Assurance is perceived as the competence of conveying trust to customers. Tangibles apparently indicates the overall facilities, equipment and employees in the organization. Empathy is the ability to provide great care and adapted attention to customers. Responsiveness can be described as the competence to offer speedy service to customers in general (Parasuramen et al, 1985).

Figure 4: SERVQUAL model



In light of the comprehensiveness of the model, SERVQUAL model has been widely utilized as a baseline in numerous fields such as service industry, hospital industry and so on. Buttle (1994) even enumerates several advantages of the model, including the reliability of the model, wide-ranging applicability for different industries, the simplicity and the standardized procedure for analyzing service quality. Most importantly, it is broadly recognized as the benchmark for evaluating different perspectives of service quality. Although it is considered comprehensive, adjustments have been made by several scholars to improve its feasibility as peoples' perceptions towards service quality keep evolving. The later version of SERVQUAL model has added 5 more elements: competence, courtesy, access, security and communication (Parasuramen et al, 1991).

With the purpose to fit the model into heath care industry, different researches have been conducted and as a result, scholars apparently have proposed different results. Specifically, it is suggested by Hulka et al. (1970) that only three elements should be included in the model, that are interpersonal relationship, convenience and professionalism. Furthermore, Thompson (1983) puts forward that average waiting time, clinical procedures, admission and discharge procedures should be taken into consideration as well. While, other scholars hold different viewpoints on how the model are ought to be formulated. Camilleri and O'Callaghan (1998) emphasizes the importance of pricing of services and customization of services; whereas responsiveness and cleanliness are favored by Hasin et al. (2001) after collecting feedback from intensive interviews of patients. Despite the fact that scholars have dissimilar standpoints on what should be included and emphasized in the model for assessing

service quality for hospitals, it is clear that most of the proposals share some commonalities such as courtesy, responsiveness, tangibles, communication and so on.

2.5 Determinants of Patients' Satisfaction - aspect from hospitals

Numerous studies have dived deep into the topic of determinants of patients' satisfaction and the result for each study varies significantly due to various factors: different management systems, locations, services, hospital personnel, patients' profile and so on. Studies pinpoint that those determinants can be categorized into two separate groups: hospitals' characteristics and patients' characteristics, since both of them play vital roles in influencing patients' satisfaction level (Kotler, 2003).

With the aim to find out the accurate determinants of patients' satisfaction level towards the case hospital, a considerable amount of relevant literature will be analyzed critically, and a unique conceptual model will be presented based on the previous discussed literatures afterwards. In the following part, I will mainly put emphasis on various significant determinants that are related to hospitals side based on SERVQUAL model, but a few modifications will be applied.

2.5.1 Professional care

Professional care can be seen as the competence of hospital personnel to provide promised and qualified care abide by hospitals' normal standards and requirements (Hatice & Zineldin, 2010), which can also be described as the reliability aspect in SERVQUAL model. It is found out that professional care plays a vital role in affecting patients' satisfaction level in numerous researches.

Andaleeb (2001) highlights that there is a significant relationship between professional care and patients' satisfaction level and satisfaction level tends to be higher when patients receive correct and proper treatment. Furthermore, professional management, the expertise on how to diagnose and treat diseases and regular monitor for the patients exert positive effects on patients' satisfaction. Conversely, poor management, amateur hospital personnel and little expertise on managing illness considerably diminishes the patients' satisfaction level (Carlin et al, 2012).

However, the situation might be utterly different in rural areas. Regarding hospitals in rural areas, the number of health specialists is exceptionally low due to unequal distribution

of health resources. Most of the hospital personnel do not have much expertise in caring and treating, since the requirement for getting recruited into hospitals in rural areas is relatively lenient. Besides, the majority of rural residents' education level is not that high (Andaleeb, 2001). As a result, patients in rural areas are not likely to evaluate hospitals' reliability on an accurate level, referring that as long as their diseases are cured and they receive decent treatment, they will be satisfied with service provided. They do not have enough background knowledge to judge if a doctor has sufficient expertise for a certain field (Batbaatar, E. et al, 2017). Additionally, they are more prone to misclassify hospital personnel's hospitality and friendliness as the sign of being reliable and professional. Hence, it is not proper to conclude that using professional care as an indicator will always provide accurate results, as outcomes may vary in different regions.

2.5.2 Interpersonal care

In spite of delivering professional care, it is also crucial to provide care with patience, to express warmness and friendliness to patients, to have clear and efficient communication as well as to actively listen to patients (Kim, 2007). Based on previous studies, a significant positive relationship is explored between interpersonal care and patients' satisfaction level. Dianna (1995) found that doctor's personality, empathy, ability to comfort patients and clear communication were highly correlated with patients' satisfaction. It indicates that if a doctor is friendly and patient, aware of how patients feel, able to ease the stress for patients and understand patients' needs clearly, patients are more likely to be content with the service provided. However, in a situation where doctor answers questions impatiently, demonstrate rude/impolite behaviors, communicate vaguely and not take the problems seriously and professionally, the negatives effects will appear, and patients tend to give more negative feedback and impressions of the hospital in general.

Regarding personal attitudes of hospital personnel, it is highly correlated with patients' satisfaction. Typically, patients do not have knowledge on what kind of illness they have and most of them experience pains and anxiety from the illness. When visiting hospitals, they expect the hospital personnel to be professional, warm and friendly. Besides, they are eager to clear their concerns by asking tons of questions. Therefore, if hospital personnel express impatience, disrespect and other unkind behaviors, the chances for patients to get frustrated and annoyed will be extremely high (Chen et al., 2013).

In terms of communication and listening skills, it is considered as the most vital factor in interpersonal care. Likewise, numerous studies states that a positive relationship exists between them and patients' satisfaction (Batbaatar, E. et al, 2017). From the perspective of hospital personnel's communications to patients, it is found out that only two thirds of the doctors communicate information of diagnosis and medication instructions to patients clearly and effectively. Besides, most of the doctors cannot memorize what patients have told them, especially when patients are in great concerns (Snyder et al., 1976). The explanation could be that doctors' attention gets distracted by the anxieties and they might be pondering of how to comfort them. Furthermore, it can be tough for doctors to process large amount of information while patients are communicating with doctors. One research points out that communication will be more effective when patients' experiencing milder symptoms and doctors are apt at listening to patients (Kincey et al., 1975).

From the perspective of patients' communication to hospital personnel, it is explored that patients often express their anxieties towards doctors instead of talking about the actual symptoms (Snyder et al., 1976). The dilemma that doctors spend a large amount of time comforting patients to eliminate their concerns tends to occur frequently. Due to the ineffective communication and deviation of topics, doctors have difficulties in diagnosing illness and giving treatment plans clearly. Consequently, some patients tend to blame doctors for not doing their jobs and question their professionalism, which leads to the low patients' satisfaction level ultimately.

In terms of the situation in China, it can be a bit complicated. Due to the large amount of patient visits each day, hospital personnel have to maintain professional and friendly attitude all the time, which is apparently difficult to follow. As the regulations are becoming harsher and competition in health care industry is getting fiercer in urban cities, hospital personnel who do not abide by the rule will be penalized and patients who feel unsatisfied with the service are able to switch hospitals freely at low costs (Snyder et al., 1976). As a result, patients' satisfaction level towards hospitals' attitudes is found to be high. For doctors, they are prone to finish the clinical sessions in a short time so that they could treat another patient. Hence, communication to patients must be concise and effective. However, in reality, doctors usually do not have time to listen to patients carefully and they solely focus on the essential parts of the clinical session, which are diagnosis, and treatment plans. For patients, they are in favor of longer sessions where they could chat with doctors to get a comprehensive understanding of their current health status and clear concerns.

2.5.3 Tangibles

Tangibles, also referred as physical environment can exert great influences on patients' satisfaction. When patients enter the hospital, the first impression of the overall environment and facility matters significantly. If the first impression fails their expectations, it is less likely for them to be satisfied with the service. Conversely, if they have a good first impression, the chances for high satisfaction level is high. It is backed up by Sovd et al. (2006) that physical environment is found to be positively associated with patients' satisfaction.

Tangibles in a hospital can consist of various elements, such as medical equipment, cleanliness, scent, room comfort, lighting, noise level, ventilation and so on (Camgöz-Akdag & Zineldin, 2010). Typically, if a hospital scores highly on these indicators, patients are more likely to give positive feedback and to have a great first impression, which subconsciously makes them want to select the same hospital for next visit. According to studies, these sub-elements do not share similar importance index. Instead, some of them matters more to patients and patients tend to pay more attention to those elements (Choi et al., 2004). Specifically, it is found out that cleanliness, noise level and medical equipment are relatively more important than other factors (Svod et al., 2006). In a study that Sovd et al. (2006) have conducted, more than 80% of the patients complain about the cleanliness in that case hospital as well as the noise level, as there are people playing music loud and the TV sound is very loud too. Additionally, patients also state the lack of medical equipment in the hospital, which is a great deficiency.

In the case of rural hospitals in China, the standards tend to be lower than urban hospitals, because less health resources are allocated to rural hospitals. In spite of the poor resources, rural hospitals are still managed to be maintained at an acceptable level. Local governments typically inspect each hospital that they are in charge of once a month to ensure that hospitals follow the standards. One research highlights that the majority of rural residents are satisfied with the cleanliness level in major areas. Nonetheless, noise level, scent and lack of equipment are what rural residents highly concerned of. At peak hours, it can be extremely noisy in the hospital where babies cry, and patients talk loudly. Furthermore, the scent in the hospital can be unpleasant sometimes, which mainly comes from disinfectors (Chen et al., 2013). In contrast, thanks to the abundant health resources and harsh regulations, hospitals are able to keep their standards at a high level. Nonetheless, one issue raised by patients is the crowded space (Dong, 2009). The average patient' visits

in a regular sized urban hospital is around 2,000, therefore, common space can be very crowded at times.

2.5.4 Accessibility

Accessibility in general refers to the convenience of accessing the hospital, average waiting time and efficient admission and discharge process (Sitza, 1997). This aspect has been studied numerous times by various scholars and a strong positive correlation has been found between accessibility and patients' satisfaction level (Crow et al., 2002). The better accessibility the hospital offers, the more likely for patients to give positive feedback.

Among these elements, average waiting time is considered the most crucial one for patients (Sitza, 1997). However, it does not neglect the importance of other elements. Specifically speaking, patients are prone to be frustrated and agitated for waiting for too long, which in turn affects their satisfaction towards the hospital considerably. Especially for emergency service, if patients need to wait longer without being notified, it is unlikely for them to return for next visit (Rahmqvist & Bara, 2010). Besides, for patients who live far away from the hospital, it can be perceived as an importance indicator as well. Regarding admission and discharge process, a study shows that 50% of the patients think the current process too lengthy and complex, which causes unnecessary time that could have been avoided (Lin et al., 2001). Faced with these situations, patients are less likely to be satisfied with the clinical experience.

In terms of the waiting time in China, it can be unreasonably long for some famous hospitals where there are more experts. Besides, the phenomenon only occurs in urban cities instead of rural areas. It is found out that the average waiting time in a regular sized urban hospital in China is approximately 30 minutes, which seem to be acceptable (Dong, 2009). Due to the substantial number of patient's visits per day, some hospitals even restrict the number of appointments per day and clinical sessions are reduced to around 10 mins per person. Nonetheless, it does not alleviate the stress in those famous hospitals. Typically, in order to book an appointment for an expert, patients have to wait for at least two weeks. In some cases, patients are willing to pay extra prices to buy the appointment from others (Chen et al., 2013). Consequently, patients in urban areas are not content with the current situation and feel unpleasant for the long waiting time. On the contrary, hospitals in rural areas take less patient visits per day than those in urban areas. Moreover, there are no experts in rural

hospitals. As a result, patients usually do not need to wait for long to get an appointment, which apparently improves patients' satisfaction level in some extent (Lin et al., 2001).

2.5.5 Price

Apart from the aforementioned factors, there is one essential aspect that cannot be neglected: price. Price has always been the element that customers are concerned about, which also applies to patients. Victor et al. (2012) conclude that there is a significant relationship between price and patient's satisfaction, and they are negatively associated. If the costs for the hospital turn out to be higher than what patients expect, patients tend to show dissatisfaction towards the hospital.

However, for patients covered by insurance, they do not care about the costs incurred from the service. Instead, they are more concerned about if they received proper and satisfactory treatment (Xiao & Barber, 2008). Hence, the logic does not apply to patients with insurance and they somehow display higher satisfaction level when costs are high, because they consider higher costs as a sign for service with better quality. Otherwise, for patients without insurance, it is unlikely for them to be satisfied with the service, which incurs high costs.

In China, although over 90% of the population is enrolled to the social insurance scheme, they are not fully exempted from paying the medical costs. As discussed in the previous part of this thesis, different insurance scheme has different reimbursement rate. Usually, rural residents will be reimbursed more than urban residents will, since their financial status is weaker and there are less health resources in rural areas (Xi et al, 2017). Nevertheless, the relatively higher reimbursement rate does not fully tackle the problem of higher costs when it comes to service that charges more, which can be for example cancer treatment. Thereby, in most cases, patients in rural areas cannot afford such high costs. What they usually do is to borrow from their relatives and friends and some of them even give up the treatment simply due to the considerably high medical expenses (Shi, 1993). Accordingly, the chances for them to have high satisfaction towards the hospital are slim. For urban residents, some of them are even insured by private insurance, which leaves them no worries in case of serious illness that requires high medical expenses. Hence, urban residents are more lenient with the pricing aspect and more satisfied with the service provide by the hospital (Xiao & Barber, 2008).

2.5.6 Organizational characteristics

Organizational characteristics consists of various aspects: reputation of the hospital, bureaucracy, regulations, corruption level and so on. One study states that patient's satisfaction level is related to organization characteristics but not able to tell if it is a positive or negative relationship as organizational characteristics contains various elements (Hall & Dornan, 1988).

In terms of reputation, Tokunaga & Imanaka (2002) found out that reputation influences patient's satisfaction positively. When a hospital has better reputation and considered as prestigious by residents, it tends to deliver more trust and security to patients, thus, patients are more likely to be satisfied with the service. On the other hand, bureaucracy can have the opposite effects on patient's satisfaction. In the case of high bureaucracy, patients find it hard to book an appointment, buy affordable medicine and to experience a simple clinical process (Hall & Dornan, 1988). As a result, a low satisfaction level could be anticipated from patients. Furthermore, administrative rules is found to be negatively associated with patient' satisfaction, as patients desire for simple and speedy service (Badri et al., 2009).

As for corruption, it indisputably has negative impacts on patient's satisfaction. In western countries, corruption can be hardly witnessed in hospitals. However, corruption level currently in China is considerably high in public sectors. Despite the fact that government is trying its best to handle the problem, corruption still pervades in some areas (Yip et al, 2012). Based on Li Hui's statement (2017), health care sector is ranked as the fifth most corrupted sector in China with the record of around 200 bribery cases per month in a hospital.

Typically, bribery cases will occur in hospitals in urban areas, where there are more specialists. As mentioned previously, it is a common thing for patients to wait for few weeks for a specialist's appointment. Resulting from that, some patients start to bribe doctors or other hospital personnel in order to get the appointment. Furthermore, if the treatment turns out to be successful, patients' family will 'award' the doctor in charge with monetary compensation (Xiao & Barber, 2008). Nevertheless, the majority patients deem it unfair and unethical for having bribery cases in health care industry. The number of complaints for bribery cases is constantly rising and government has established extremely harsh regulations on these activities, which significantly lowers patient's satisfaction.

Although the situation is better in rural areas, corruption still exists as people always seek for fast and convenient service. For residents with better financial situations, when they are diagnosed with severe illness, they usually pay directly to the specialist who works in famous hospitals in urban cities and ask specialists to treat them locally. By doing this, it spares the patients from going to urban cities and waiting for several weeks for a specialist appointment. However, it is against the hospital regulations. The trend is not stopping because specialists can earn massive profits thorough this, which is considerably more than their average salary (Yip et al, 2012). Nonetheless, it is not likely for patients with poverty to enjoy this kind of service. When they are diagnosed with severe diseases, they cannot afford the enormous amount of medical expenses and seek for treatment in urban hospitals where there are specialists and more advanced medical equipment. All they could do is to treat at home by constantly taking medicine or to receive useless treatment in rural hospitals (Lin et al., 2001). As a result, the inequality and corruption cases further impair patients' satisfaction towards hospitals.

2.6 Determinants of Patients' Satisfaction - aspect from patients

Apart from those determinants from hospitals' aspect, studies have shown that patients' characteristics play an indispensable role in affecting patients' satisfaction towards hospital (Jenkinson et al., 2002). The determinants can include age, gender, profession, education level, socio- economic status and so on. In the following part, these aspects will be discussed and analyzed thoroughly.

2.6.1 Age

Patients' age varies substantially in different hospitals. For hospitals in rural areas in China, more than 70% of the patients are old people, because young generation mostly move to cities to work and study. Whereas regarding hospitals in urban areas, the ratio is rather even (Chen et al., 2013). Numerous studies have concluded that age exerts great influences on patients' satisfaction (Jaipaul & Rosenthal, 2003). Patients with different ages tend to exhibit satisfaction in a different scale. Sitzia and Wood (1997) discover that older patients tend to display more satisfaction towards service provided by hospitals than young patients do. They explain that older patients have experienced the time where healthcare industry was under

development. Therefore, by comparing to how healthcare industry is progressing and improving nowadays, older patients are satisfied with what they receive.

For younger patients, as they pursue better service and expect more from what they get, it is often that they show dissatisfaction to hospitals (Fan et al., 2005). However, other scholars disagree with the positive correlation between age and patients' satisfaction. Scotti (2005) contends that older patients are more likely to give negative feedback, because they often feel lonely and complaining to hospital personnel about the service becomes a channel for them to chat with others. Furthermore, they need more prudent and caring service than young patients do since their health conditions are poor. Hence, if nurses fail to deliver such service, chances are slim for them to be satisfied with the service. According to those literatures, it can be indicated that age is not always the correct measure for patients 'satisfaction.

2.6.2 Gender

In terms of gender, evidence shows that patients' satisfaction is greatly influenced by gender (Carlin et al., 2012). However, scholars seem to have conflicts in deciding whether men or women will exhibit more satisfaction to hospital services, because their researches produce significantly distinct results. Ware et al. (1978) initially claim that women tend to be more satisfied with hospital services than men do. They further explain that women are more rational and dispassionate regarding to personal characters, and when they are encountered with conflicts, they more likely to find a peaceful way to solve it and try to avoid further conflicts. Hence, when women have dissatisfaction towards hospital services, they are less likely to express it in the survey. On the contrary, men are more hot-tempered and easily to get angry. Faced with conflicts, men are prone to use more straightforward ways to handle the issue without being rational. As a result, lower satisfaction scores can be witnessed among men.

Contrastingly, it is disputed by Quintana et al. (2006) that men are more satisfied with hospital services than women are. They clarify that men sometimes can be unconcerned. Specifically, men tend to focus more on the results than the experience itself. If they are cured, chances are high for them to be satisfied with hospital services. However, for women, they are attentive to details and the service that they experience in the hospitals. If something goes wrong or upsets them, they will notice and are more likely to give negative feedback to the hospital no matter if they have been cured or not.

Based on the literature, it can be seen that no obvious pattern between gender and patients' satisfaction can be found. Nevertheless, for different cases, results might change accordingly, and gender can be an important indictor to certain hospitals where gender ratio is uneven and males and females exhibit opposite characters.

2.6.3 Education

Education cannot be neglected as an important predictor for patients' satisfaction level. Studies have found that education level is negatively correlated with patients' satisfaction level, indicating that the higher degree that a person has achieved, the more likely that he/she will be satisfied with hospital services (Sitzia & Wood, 1997). Al-Qatari & Haran (1999) further support the argument by claiming that literate patients will show more satisfaction towards hospital services than illiterate patients will. The underlying reason can be that patients who get more education are aware of how hospital operate in general and how hard it is for hospital personnel to keep professional and friendly attitude for the whole day. However, as for less educated patients, they have less knowledge on hospital's operation models and do not have empathy for hospital personnel. Therefore, they are less likely to be satisfied with hospital services.

On the contrary, other researches also stress that illiterate patients show higher satisfaction score than literate patients do (Grondahl et al., 2013). Similar to gender, it is hard to draw a line to determine whether education level has positive or negative effects on satisfaction level, since each side is backed up by different scholars.

In China, the majority of rural residents are less educated, since most of their family are farmers, which do not require high degrees and specific expertise. Lin et al. (2001) find that patient in rural areas surprisingly exhibit high satisfaction scores to hospital services. It can be possibly explained by the poor health resources and the fact that hospital personnel are more careful and attentive. For urban areas, the average education level is relatively higher and 80% of the urban residents have at least attended secondary school (Dong, 2009). Besides, it is highlighted by Xiao & Barber (2008) that patients with higher academic degrees in urban areas are more likely to be dissatisfied with hospital services. It can be explained that patients who get more education tend to be more captious with health services and if the provided service fails to achieve their expectations, lower satisfaction scores can be anticipated.

2.6.4 Social-economic status

Social-economic status, as well plays a vital role in affecting patients' satisfaction. Footman et al. (2013) concludes that there is a positive association between social economic status and patients' satisfaction. Patients with higher social economic status will be more satisfied with hospitals services and vice versa. However, the implication can be prejudiced since patients with higher social economic status are prone to choose hospitals with better reputation, services and medical equipment. Hence, it is obvious that they will display higher satisfaction level. For patients with lower social economic status, their choices are mostly limited to common public hospitals where the waiting time is considerably long and service is just acceptable, therefore, a lower satisfaction score could be expected. Hence, the results can be considerably different depending on which case hospital is chosen.

In China, the income gap is substantially giant between urban and rural areas, and it affects patients' satisfaction for hospital service significantly. In rural areas, 90% of the residents are not able to afford medical expenses related to critical illness and expensive medications (Fan et al., 2005). Furthermore, some of them could only afford to visit the local health centers and clinics where the health resources are poor, and services are under performed compared to urban hospitals. As a result, it is reasonable that rural residents show low satisfaction scores with hospital services in general. In contrast, wealthy residents in China have more options concerning health care services. They can choose to go to private hospitals which offer premium services and world class doctors. Hence, they are more likely to be satisfied with hospitals services (Xi et al, 2017).

2.6.5 Health conditions

Hekkert et al. (2009) declare that health condition is found out to be the most significant determinant to patients' satisfaction in their studies. Like some determinants from patients' perspective, it is explored that health condition is positively correlated with patients' satisfaction, referring that patients with poor health conditions tend to give lower satisfaction scores to hospital services (Jackson et al., 2001). Furthermore, it is noted by Scotti (2005) that patients who suffer from chronical diseases and great pain physically and mentally are prone to be dissatisfied with hospital services. It can be clarified that these patients are already burdened with massive pressure and pain, and if confronted with unpleasant circumstances, they will be agitated shortly, and low satisfaction level can be expected.

On the contrary, Carlin et al. (2012) highlight that patients who suffer from cancer and other deadly diseases tend to be more pessimistic and surprisingly exhibit higher satisfaction scores. They further claim that patients with deadly diseases often become passive and quickly lose confidence in sustaining their lives. Consequently, they do not care the quality of hospital services, how they are treated and if they are satisfied with the services, because those things do not seem to be vital to them anymore. Hence, when being surveyed, they tend to give high satisfaction scores.

Additionally, evidence shows that mental illness plays the most significant role in affecting patients' satisfaction according to Cohen (1996)'s research among all kinds of illness. Typically, patients with mental illness suffer greatly from depression, anxiety, stress and lack of sleep. Influenced by the negative aspects, they are easy to be infuriated even for some trivial things, which in turn affects their ability to measure if they are satisfied with the hospital services unbiasedly.

2.7 Summary of Literature review

In the chapter of literature review, first, the overview of the Chinese health care insurance system is introduced. In the overview, it mainly covers four Chinese health care insurance schemes: Urban Employee Basic Medical Insurance (UEBMI), Urban Residence Basic Medical Insurance (URBMI), New Rural Cooperative Medical Scheme(NRCMS) , Commercial Health Insurance and health insurance for employees working in government organizations. Later on, the basic structure of Chinese health care delivery system is discussed. Afterwards, critical problems related to Chinese current health care system are illustrated and analyzed. The problems consist of unequal distribution of health resources between rural and urban areas, inefficiency in health care units, high costs for health care and fragmented health care system.

In the latter part, the emphasis is shifted to patients' satisfaction. Initially, the definition of patient's satisfaction is clarified by comparing different scholars' philosophy towards patients' satisfaction. Afterwards, the SERVQUAL model is brought up as a tool to measure service quality. To apply it on hospital services, various researchers have proposed different views on what elemements should be included in the enhanced model.

Then, the most important section of this thesis' literature review is presented, which is the discussion of earlier studies on determinants of patients' satisfaction. However, the section is further divided into two parts from two different perspectives: determinants from

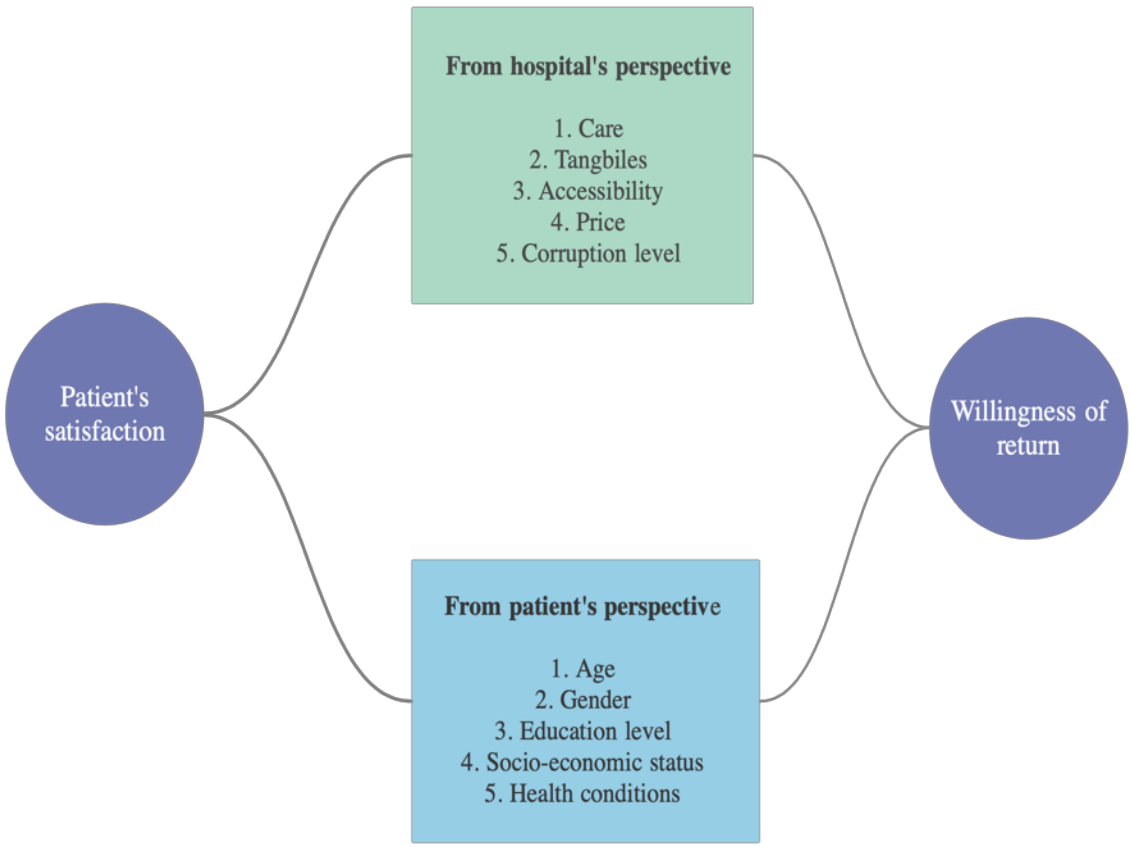
hospital's aspect and determinants from patient's aspect. Specifically, in terms of determinants related to hospitals, predictors can consist of the professionalism of care, quality of interpersonal care, tangibles, accessibility, price and organization characteristics. Among these predictors, it is found out that interpersonal care and price are the most powerful influencers of patients' satisfaction, while organization characteristics being the least (Schoenfelder et al., 2011). Regarding determinants concerning patient, the predictors can include: age, gender, education level, social-economic status and health conditions. It turns out that social-economic status and health conditions are considered as the most significant factors in influencing patients' satisfaction (Hekkert et al., 2009).

3 Conceptual Framework and Hypotheses Development

3.1 Conceptual Framework

The conceptual framework is developed and built based on earlier discussed studies that have explored various important predictors for patients' satisfaction. Besides, a fraction of SERVQUAL model is incorporated into this model with mild modifications. As can be seen in Figure 7, patients' satisfaction is affected by two aspects: determinants related to hospitals and determinants concerning patients. Regarding the aspect of hospital, it is further drilled down to five sub elements: Care, Accessibility, Tangibles, Price and Corruption level, while Care contains Professional care and Interpersonal care. In terms of aspect of patient itself, it consists of Age, Gender, Education, Socio-economic status and health conditions.

Figure 5: Conceptual Framework



3.2 Hypotheses Development

In accordance with the conceptual model and previous studies, the following hypotheses will be proposed for the case hospital:

In light of Andaleeb (2001)'s study, the better professional care that a hospital can provide, the higher chances that patients will be satisfied with the hospital's services. Likewise, it is pointed out by Dianna (1995) that high level of interpersonal care leads to higher satisfaction scores. Hence, it is proposed that:

H1: The perceived level of care is a significant predictor and is positively correlated with patient's satisfaction in the case hospital.

Based on Crow et al. (2002)'s research, it concludes that the high level of accessibility is beneficial in raising satisfaction scores of patients. Specifically, high level of accessibility refers to less waiting time, easily accessible locations, faster and more efficient admission and discharge process. Therefore, the following hypothesis is presented:

H2: The perceived accessibility is a significant determinant and is positively associated with patient's satisfaction in the case hospital.

In view of Sovd et al. (2006)'s study, it claims that tangibles in a hospital have crucial impacts on patient's satisfaction level. Additionally, better medical equipment, clean hospital environment, less noise, pleasant atmosphere and cozy room make patients more prone to rate higher satisfaction scores for the hospital. Thus, I propose the following:

H3: Tangibles play a significant role in affecting patient's satisfaction in the case hospital.

Numerous earlier studies have found out that price is an extremely significant predictor for measuring patient's satisfaction. Furthermore, it is noted by Victor et al. (2012) that higher price results to more dissatisfaction among patients. However, it is contended by Quintana et al. (2006) that wealthy people do not mind high medical expenses, thus, they would rate the hospital' services in regardless of price. In spite of the argument, the following hypothesis is developed based on Victor et al. (2012)' study:

H4: Price is a significant determinant and is inversely correlated with patient's satisfaction in the case hospital.

Corruption level is the only element that is discussed by the least literature, since in western countries; the average corruption level is so little that can be ignored. Nonetheless, in China, the situation is completely different. Due to the high level of corruption in health care sectors, Xiao & Barber (2008) claims that the high level of corruption deteriorates patient's satisfaction substantially. Hence, I put forward the following hypothesis:

H5: Corruption level is the significant predictor for evaluating patient's satisfaction in the case hospital.

As one of the demographic determinants, age is found out to be positively correlated with patient's satisfaction by Sitzia and Wood (1997). Although other scholars hold opposite viewpoints, the majority of the research's results is in line with the previous statement. Hence, the following proposal is made:

H6: Age is a significant determinant and is positively correlated with patient's satisfaction in the case hospital.

In view of Carlin et al. (2012)'s research, it concludes that age plays a vital role in affecting patient's satisfaction towards hospital services. Additionally, arguments on whether male or female displays higher satisfaction scores remain by various scholars. In China, there are numerous cases on male patients hurt doctors and file complaint about hospitals while for females, the situation is rarer. Therefore, I propose the following:

H7: Gender is a significant factor and male exhibits lower satisfaction scores than female does in the case hospital.

According to Al-Qatari & Haran (1999)'s research, it points out that education level is positively correlated with patient's satisfaction, which is further supported by several scholars. Besides, in China, there is a huge gap between the number of highly educated people and under educated people. Hence, there is a reason to believe that education will exert great influences on patient's satisfaction. In accordance with previous studies, the following hypothesis is brought up:

H8: Education level is a significant determinant and is positively associated with patient's satisfaction in the case hospital.

Footman et al. (2013) claim that the higher the socio-economic status that a patient has, the more likely the patient will be satisfied with hospital services. Likewise, the wealth gap in China is substantially giant. It is brought up by Xi et al. (2017) that wealthy patients in China have a tendency for higher satisfaction scores. Thus, the following hypothesis is presented:

H9: Socio-economic status is positively associated with patient's satisfaction in the case hospital.

Considered as the most significant determinant by Hekkert et al. (2009), health status is found out to be positively associated with patient' satisfaction. Align with the finding, I propose the following:

H10: Health condition is a significant determinant and is positively correlated with patient's satisfaction in the case hospital.

4 Methodology

In this chapter, the research methodology that is used in the thesis will be introduced in detail primarily. Afterwards, I will proceed with research design development, which includes the elaboration of my research instrument, pre-test, data collection and data cleansing. The last part of the chapter will focus on the data analysis methodology and validity and reliability.

4.1 Research Methodology

For every research, an appropriate methodology is essential for producing the optimal results. However, it is not always simple to select a research methodology. According to Sogunro's statement (2002), a dilemma where researchers struggle to select the most suitable methodology is encountered by most researchers. Commonly, there are two principal methods, which are being used universally by numerous researchers: quantitative and qualitative approaches (Yilmaz, 2013). However, it does not infer that all researches can be applied with these two methods, since different research objectives can lead to different research methods. Sometimes, a mixture of the two method could be utilized in one research.

Based on Creswell's explanation (1994), a quantitative research focuses on clarifying problems based on the implication numerical data, which will be thoroughly analyzed with various statistical methods. Typically, in quantitative research, research techniques is mainly questionnaires, that are distributed to target groups according the research purpose. On the contrary, in terms of qualitative method, Strauss and Corbin (1998) claims that qualitative research is the type of research whose findings are not produced by utilizing statistical methods or other ways of quantification. It is apparent that this claim is purely constructed on the basis of research technique, while neglecting other perspectives of research design. As an improvement on the definition, it is further brought by Yilmaz (2013) that qualitative research emphasizes on comprehending a problem by using descriptive words from various informants in a natural setting. The mainstream research technique in qualitative research is considered as interviews.

In this research, as one of the research objectives is to find out the significant determinants affecting patient's satisfaction, the results have to be representative. Therefore, the quantitative method will be more applicable in this case. If selecting qualitative method, each interview will take around half an hour, while by conducting only a few interviews cannot produce accurate results since a few patients' opinions are not able to represent the

others' views. However, for quantitative method, it takes less time for people for fill out a questionnaire. As a result, more views on hospital satisfaction can be collected within a reasonable amount of time.

4.2 Instrument development

As discussed in the previous part, the chosen research methodology is quantitative method. Thus, a questionnaire has to be designed and developed to help find out the significant determinants influencing the case hospital's satisfaction. Since the case hospital is a Chinese hospital, the target respondents will be Chinese. Therefore, the survey needs to be formulated in Chinese in order to make it more understandable and accessible for the respondents. However, an English version will be still designed and presented in my thesis for the sake of the readers and my supervisors.

Basically, the questionnaire is divided into four parts: the first part lets patients reflect on their overall satisfaction towards the case hospital. The second part mainly focuses on the determinants derived from the aspect of the case hospital, the third part emphasizes on the determinants derived from the aspect of patients, while the last part measures patient's willingness to return to the case hospital. The first part of the questionnaire comprises two questions in total, which are presented in a 7-point Likert scale format with zero is the minimum score, while seven is the maximum score.

Table 1: Survey Items in the first part

Item Number	Dimension	Survey Question
1	Satisfaction score	How are you satisfied with Shahu Central Hospital?
2	Satisfaction score	How would you rate the service quality that Shahu Central hospital provides?

The second part consists of 20 questions in total. Likewise, the format of these questions is a Likert scale with zero is the lowest score while seven being the highest. Each of the question represents different dimension, which is based on the conceptual framework of the thesis. Specifically, the following questions will measure how patients view the

interpersonal care, professional care, accessibility, price, tangibles, and corruption level aspects of the case hospital. Generally, the number of questions is divided differently for each aspect. For accessibility, profession care and tangibles, there are four questions each. In terms of price and interpersonal care, the number of questions is three each. While corruption level has only two questions. The weight for each aspect is determined on the previously discussed literature review.

Table 2: Survey Items in the second part

Item Number	Dimension	Survey Question
1	Accessibility 1	When I need help, hospital personnel can respond without delays.
2	Accessibility 2_rev	I have to wait for a long time for a doctor's appointment.
3	Professional care 1_rev	When performing examinations, I do not think doctors have done in a carefully and professionally way.
4	Accessibility 3_rev	I think the current service time for a doctor should be lengthened.
5	Corruption level 1	If I do not tip doctors, I do not think they will provide professional and good service to me.
6	Tangibles 1	The hospital is very clean in general.
7	Interpersonal care 1	Doctors always treat me with respect.
8	Price 1	For some services, I think the prices for them are a bit overwhelming.
9	Tangibles 2	The hospital personnel have a clean appearance.
10	Professional care 2	When prescribing medicine to me, doctors always

		explain the instructions and side effects to me clearly.
11	Tangibles 3	I do not feel there is excessive noise in the hospital when I visit the hospital.
12	Tangibles 4_rev	The medical equipment in the case hospital is not enough.
13	Price 2_rev	I think the price here is reasonable for the service provided in the case hospital.
14	Interpersonal care 2	Doctors do their best to alleviate my worries about my health.
15	Price 3_rev	Even if I am not wealthy, I am still willing to visit the case hospital.
16	Professional care 3	Hospital personnel have sufficient knowledge to solve my questions.
17	Professional care 4	Doctors ask about my symptoms and health conditions in details.
18	Accessibility 4	It is convenient to reach the case hospital.
19	Corruption level 2	I think doctors expect to receive tips.
20	Interpersonal care 3	Hospital personnel are willing to answer questions patiently.

The third part of the questionnaire concerns the demographic questions and there are five questions in total, which include age, gender, education level, perceived health conditions and monthly salary. The age input lets respondents put their ages in numeric format (e.g. 24 instead of 1995). The gender question lets respondents choose their gender. The educational level question lists of series of options for respondents to choose (e.g. bachelor's degree). Regarding health conditions, there is a scale from 0 to 100, allowing patients to determine their health conditions. The last aspect: social-economic status is

measured by the monthly income. Respondents can freely choose their income range in the question (e.g. 5000-7000RMB).

Table 3:Survey Items in the third part

Item Number	Dimension	Survey Question
1	Age	What is your age?
2	Gender	What is your gender?
3	Education level	What is your highest degree achieved?
4	Health conditions	How do you think of your current health condition?
5	Socio-economic status	What is your monthly salary?

T he last part has only one question, which is about patients' willingness to return to the case hospital in the future. The question is given in a Likert scale format with 0 representing the least willingness while 7 inferring the highest willingness.

Table 4:Survey Item in the last part

Item Number	Dimension	Survey Question
1	Willingness to return	If needed, how willing are you to return to the case hospital in the future?

The initial version of the questionnaire has gone through the pre-test process, which is required to improve the quality of the questionnaire. Generally, the initial version was distributed to a total of 5 patients in the case hospital in a paper format. Feedback has been collected to improve the wordings, typo, order of questions and overall format.

4.3 Data collection

When the ultimate version of the questionnaire is finalized, actions are taken to seek for channels to distribute the questionnaires to target respondents. With the number of Chinese using mobile phones increasing drastically, it is terribly convenient to fill out the questionnaire online. Wenjuanxing, as the Chinese leading web-based survey platform, is ultimately deployed in this research to help distribute the questionnaires to patients in the case hospital. Considering the fact that the case hospital in located in rural areas where there are more elderly citizens, I decide to print out the questionnaires in paper format, which makes elders easier to fill out since the majority of them are not able to use smart phones.

As the case hospital in located in China and the author is situated in Finland, I have to resort to my father, who is the director of the case hospital. Generally, survey link and the QR code are displayed and sent to target respondents, and people will be directed to the survey page, to my father. Then, he posted the link and QR code in the offices where nurses and doctors work daily. The hospital personnel are instructed to ask patients to fill out this survey, however, this is not compulsory. Regarding questionnaires in paper format, these were placed in the front desk and offices where patients can get access to it effortlessly. The results then were recorded by the hospital personnel by feeding them into Wenjuanxing. The results are double checked to see if there are any errors by comparing with the original copies of results.

Based on the feedback from the pre-test, the average time for filling out the questionnaire is approximately one and a half minute. It can be tedious for people to fill out questionnaires sometimes and researchers have to try their best to get as much responses as they could in a short time. Therefore, in order to increase the response rate, I added a prize draw for people who have successfully completed the questionnaire and left their phone numbers at the end of the questionnaire. The prize will be drawn in mid-December and six winners will be drawn from the pool in total. Winners will be notified via text messages respectively. Furthermore, the time window for the questionnaire is from 04 November 2019 to 12 November 2019, which sums up to 9 days in total. All data collected from the questionnaire will be kept confidential and is only for academic purposes. The data will be analyzed using Python and Alteryx (A data analytics platform) to produce descriptive, statistical and predictive results.

4.4 Data cleansing

After the questionnaire is closed for further submits, it is counted that 283 responses have been well received and recorded in sum. Nevertheless, not all the data is valid. After a thorough and comprehensive assessment, 12 results are filtered out either due to quick fill-up time or non-logical responses, leading to a total amount of 271 valid responses. For example, a respondent answers that he is extremely satisfied with the case hospital, but he rates one of the care aspects a zero point, which does not make any sense. Thus, these kinds of responses are discarded. As calculated, the usable rate of the overall responses is around 97%, which is significantly high. The reason might be that patients show great interests in improving the case hospital.

Besides, as some of the questionnaire questions are formatted as reverse scales. The corresponding results need to be converted back to the normal scale before analysis. For example, for question 13, when respondent selects 3 for it, it will be converted to 5 in this stage. Furthermore, no null values have been inspected in the sample, therefore no actions are required to fill the null values.

4.5 Reliability and Validity

When conducting researches, it is crucial to assure that the results are accurate and meaningful. Besides, it can be usual when researchers do not know if the results precisely represent the corresponding variable. In order to resolve the problem, two major concepts are presented: Reliability and Validity.

4.5.1 Reliability

In terms of reliability in research, it pertains to the consistency of the measurement. More specifically, it measures whether the measurement is applicable in other circumstances and outputs the similar results (Golafshani, 2003). If a person scores differently on the same test multiple times, then the reliability of the test is considered extremely low. Generally, there are three types of reliability that are used commonly: Test-retest reliability, Internal consistency and Inter-rater reliability. Regarding test-retest reliability, it is a relatively traditional way to measure reliability. Test-retest reliability refers to the consistency of scores on the same test for multiple times. For high test-retest reliability, the test needs to

have same scores every time the same test is performed (Charles, 1995). Therefore, if a measure produces distinct results on the same test over time, it is apparently cannot be used as a reliable construct. In order to compute the test-retest reliability, two separate experiments are usually needed with the same target respondents and in the same conditions, which means that nothing will be changed except for the time when the experiment is conducted.

In terms of Internal consistency, it measures the consistency of respondent's views on the same concept by answering a group of questions (www.pdx.edu). Generally, the answers for all the questions should be consistent since they reflect the same concept. For example, if the respondent answers that he/she enjoys shopping in the mall, then for the next question he/she answers that he/she is not satisfied with the service that the mall provides. Then, it can be seen as a case of low internal consistency. A measure with low internal consistency should not be adopted in a questionnaire.

As for inter-rater reliability, typically, when conducting an experiment, there is only one observer. The interrater reliability can be utilized to calculate the results' consistency when multiple observers are used in an experiment (ibid). Optimistically, the final outcomes from various observers should be roughly similar or correlated to each other as the experiment does not change.

4.5.2 Validity

Validity refers that whether the result from a measure can represent the real intentions of the measure. Typically, there are three types of validity that are universally deployed in researches: Face validity, content validity and criterion validity (Cook & Campbell, 1979).

Regarding face validity, it simply indicates the extent to which if a construct appears on its face accurately expresses its true intentions (www.opentextbc.ca). Specifically, if the construct wants to measure if a person likes to eat seafood or not, then the question itself has to include the corresponding information. If the question tends to ask about the weight of a person, it is considered low face validity, which will be usually discarded. However, face validity is perceived as a relatively inadequate measure to evaluate validity, because it is simply constructed on the basis of people's instincts. Especially for psychology researches, the question has to be implicit and euphemistic instead of being too direct. Otherwise, the respondents might not give the accurate responses.

Content validity evaluates if a measure has sufficiently covered every aspect of construct that it is intended to measure (ibid). Specifically, if a scholar has clearly specified pleasure as consisting of positive thoughts and happy feelings, then the measure has to take the two aspects into consideration.

In terms of criterion validity, it measures whether the results from a measure have the expected correlation with the target variable (ibid). For example, eating too much everyday should be positive correlated with the person's weight normally. If the test' results show a positive relationship between the fact of eating too much and weight, then it is perceived that the measure has high criterion validity. On the contrary, if a negative correlation is found out, then a low criterion validity will occur, and the measure will be mostly likely eliminated from the test.

4.5.3 Reliability test

In order to test the reliability of the questionnaire, a reliability test is performed with SPSS Statistics and Cronbach's Alpha is the evaluation index. According to the results, all the variables have a Cronbach's Alpha value larger than 0.7. The highest Cronbach's Alpha value belongs to professional care, which has the value of 0.893. It indicates that the results are highly consistent in all profession care related questions. To recapitulate, the questionnaire shows a satisfactory result of internal consistency and the responses are reliable for further analysis.

Table 5:Reliability test for items in Likert scale format

Item	Cronbach's Alpha	N of Items
Service Accessibility	0.834	3
Professional care	0.893	4
Interpersonal care	0.883	3
Tangibles	0.819	4
Price	0.840	3
Corruption level	0.750	2

4.6 Major methods for statistical and diagnostic analysis

In this chapter, a concise explanation will be presented for the statistical and predictive methods that will be used in this research.

4.6.1 Correlation analysis

For correlation analysis, it is crucial to evaluate the relationship of two or more variables. Particularly, if the variables are proved to be associated, it sparks researchers' interests in exploring how robust the relationships are and whether they are positively correlated or not (Chok, 2010). Hence, it is crucial to apprehend the different types of correlation analysis and find out the most appropriate ones for your research.

Correlation analysis is universally used to measure the extent to which variables are correlated with each other. It is noted by Sheskin (2007) that two variables are considered associated if one of them is dependent on the other, meaning that when the value of A changes, the value of B will change accordingly. For positive correlation, it indicates that as the value of A increase, the value of B will increase correspondingly. On the contrary, negative correlation refers that when the value of A increases, the value of B will decrease instead.

As stated by Chok(2010), there are three types of correlation analysis that are widely used: Pearson correlation, Spearman' rank correlation and Kendall's correlation. Among the three types of correlation analysis, Pearson correlation is perceived as the most pervasive one. Factually, the range of Pearson's correlation coefficient is from -1 to +1, and for coefficients in the range of -1 to 0, the relationship is considered negative correlation; while positive relationship is determined when coefficients are in the range of 0 to +1.

Regarding Spearman' rank correlation, it is measuring the monotonic relationship between two variables (Chen, 2002). Its coefficient is considered as Pearson's correlation coeffient being converted to ranks. Unlike Pearson correlation, it only takes two variables as inputs. As for Kendall's correlation, it only measures the strength of the relationship between two ordinal variables (Chok, 2010). It is commonly used because it is easy to be implemented and less sensitive to outliers.

4.6.2 Linear regression analysis

Linear regression is a widely used method in predictive analysis. The core concept of it is to measure the relationship between target variable and independent variables as well as to predict the outcome of a certain event.

Furthermore, there are various types of linear regression apart from simple linear regression. It is highlighted by Malhotra & Birks (2006) that multiple linear regression, logistic regression, multinomial regression are typical linear regression models as well. In this research, linear regression model will be used as the main analytical method.

4.6.3 Decision tree

Apart from linear regression analysis, decision tree method also sheds lights on producing optimal results. Generally, decision tree method is a supervised learning approach and a decision tree is built up by numerous internal nodes. leaf nodes stand for labels, while nonleaf nodes represent different features (Leonard, 2017).

As one of the most prevalent supervised learning approaches, decision tree method outputs results with high accuracy and stability. Unlike linear regression analysis, non-linear relationships can be handled and analyzed comprehensively using decision tree. Therefore, it is perceived to be extremely flexible when it comes to the large variance in different datasets. Furthermore, there are two types of decision tree model: decision tree regression and decision tree classification, while the latter one is more often used because based on the tree it provides, it can be effortless to tell which label the variable belongs to.

Regarding the advantages of adopting decision tree model, first, the results are rather easy to be interpreted. Even for beginners who do not have sufficient knowledge on decision tree, they are able to use the model and interpret the results without any hassles. Second, not much efforts need to be invested in data cleansing stage since outliers do not affect decision tree model significantly. Lastly, for most of the machine learning models, hyperparameter tuning is considered crucial for a reliable result (ibid). However, it is relatively easy to tune the parameters in decision tree model, which saves a considerable amount of time for users.

4.6.4 Random forest

Among all the predictive analysis methods, random forest cannot be neglected as a powerful tool to classify observations and to predict outcomes. Factually, random forest model is

composed of numerous decision trees and the core concepts are randomly sampling data points while building decision trees as well as randomly choosing variables while splitting nodes (towardsdatascience.com).

Typically, there are two usages of random forest: random forest classification and random forest regression. Random forest classification emphasizes on predicting the category of a data point, while the latter focuses on predicting the quantities (e.g. inventory, price and demand). In this research, emphasis will be put on random forest classification to predict whether a patient will return to the case hospital in the future or not.

In terms of the merits of using random forest, it is considerably fast to train the dataset as well as to predict outcomes when it comes to large dataset. Furthermore, it can be often that dataset is unbalanced, which leads to biased results ultimately. Random forest could help balance the dataset by reducing the errors.

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5 Findings

In this chapter, a thorough demonstration of the respondents' profile will be presented. First, attention will be paid to descriptive information of the collected responses. Then, the Pearson correlation analysis' results will be clarified and outcomes for linear regression model will be explained comprehensively. Meanwhile, the abovementioned hypotheses will be evaluated based on the produced outcomes.

5.1 Respondents' Profile

The total sample size for the research is 271, which are valid responses received from patients visiting case hospital. As can be seen in Table 6 , the average age of the sample is around 43 years old, which could be considered considerably high. The respective minimum and maximum ages are 18 and 80. From the frequency plot, it can be seen that the majority of our respondents are between 40 to 70 years old, reflecting that our respondents are mostly elders. Regarding gender, 141 respondents are male and 130 are female, which is rather even.

In terms of education level, the average education level is approximately 3, which equals to high school degree. The lowest degree from our sample is primary school degree, while the highest being the master's degree. Based on the frequency plot, most of our respondents' education levels range from middle school to bachelor's degree. Specifically, 94 respondents finish their high school and 87 of them have achieved bachelor's degree. As for health conditions, the average health condition is 78.8, which is good. However, the lowest health score is 38, which is far from the highest:100. It can be indicated that the health condition gap in the sample is relatively giant. Nonetheless, the frequency plot highlights that most of our respondents are in good health, which are in the range from 70 to 90. Also, 34 respondents think that they are in perfect health condition with the score of 100.

Regarding the monthly income, the average income is roughly in the range from 4000 to 6000 RMB. Likewise, the gap between the lowest monthly income and highest monthly income is considerably huge. In the frequency plot, there is a clear pattern that 55 percent of respondents are gaining 3000-5000 RMB per month. 12 respondents have a monthly income of 10000RMB and above.

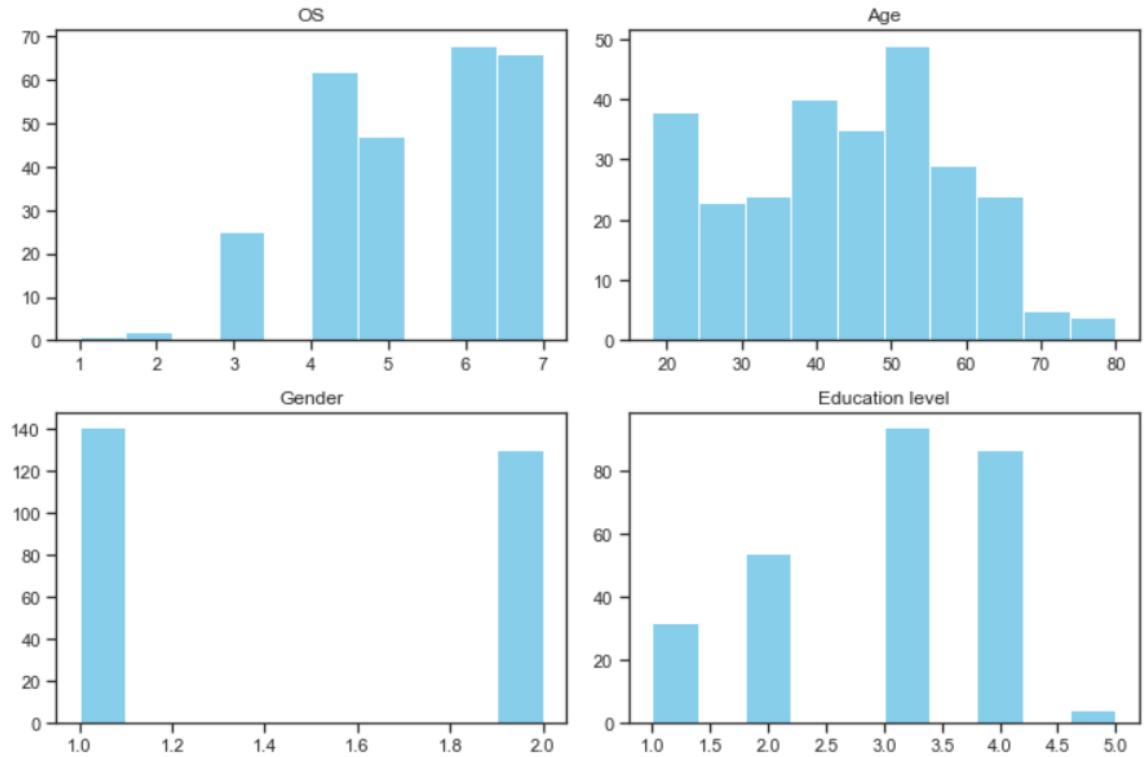
Lastly, in terms of the overall satisfaction score that respondents rate for the case hospital, the average satisfaction is around 5.287, which is rather positive. Based on the

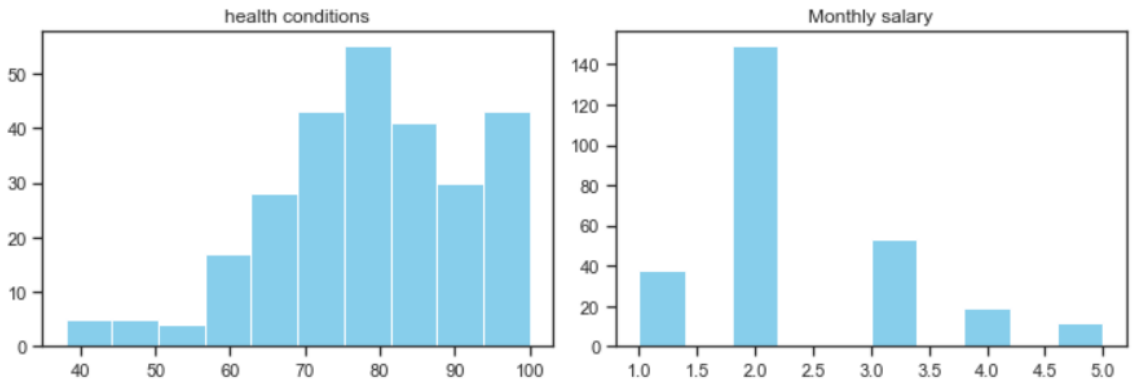
frequency plot, a large percent of respondents scores the overall satisfaction over 4. Nearly 50% of the respondents are extremely satisfied with the services (scores with 6 and above). However, there are 3 respondents rating the satisfaction level as 1 and 2, which are rather low scores.

Table 6: Descriptive statistics of the sample

Stats/Item	Overall Satisfaction	Age	Gender	Education level	Health conditions	Monthly income
Count	271	271	271	271	271	271
Mean	5.287	43.65	1.47	2.91	78.8	2.328
Min	1	18	1	1	38	1
Max	7	80	2	5	100	5

Figure 8: Frequency charts for demographical items





5.2 The summated scale

As there are multiple questions in the questionnaire intended for one single construct, it is necessary to combine the responses for every construct. Therefore, a summated scale is used by calculating the average score for each construct and afterwards, the results will be used in the later analysis parts.

5.3 Pearson Correlation Analysis

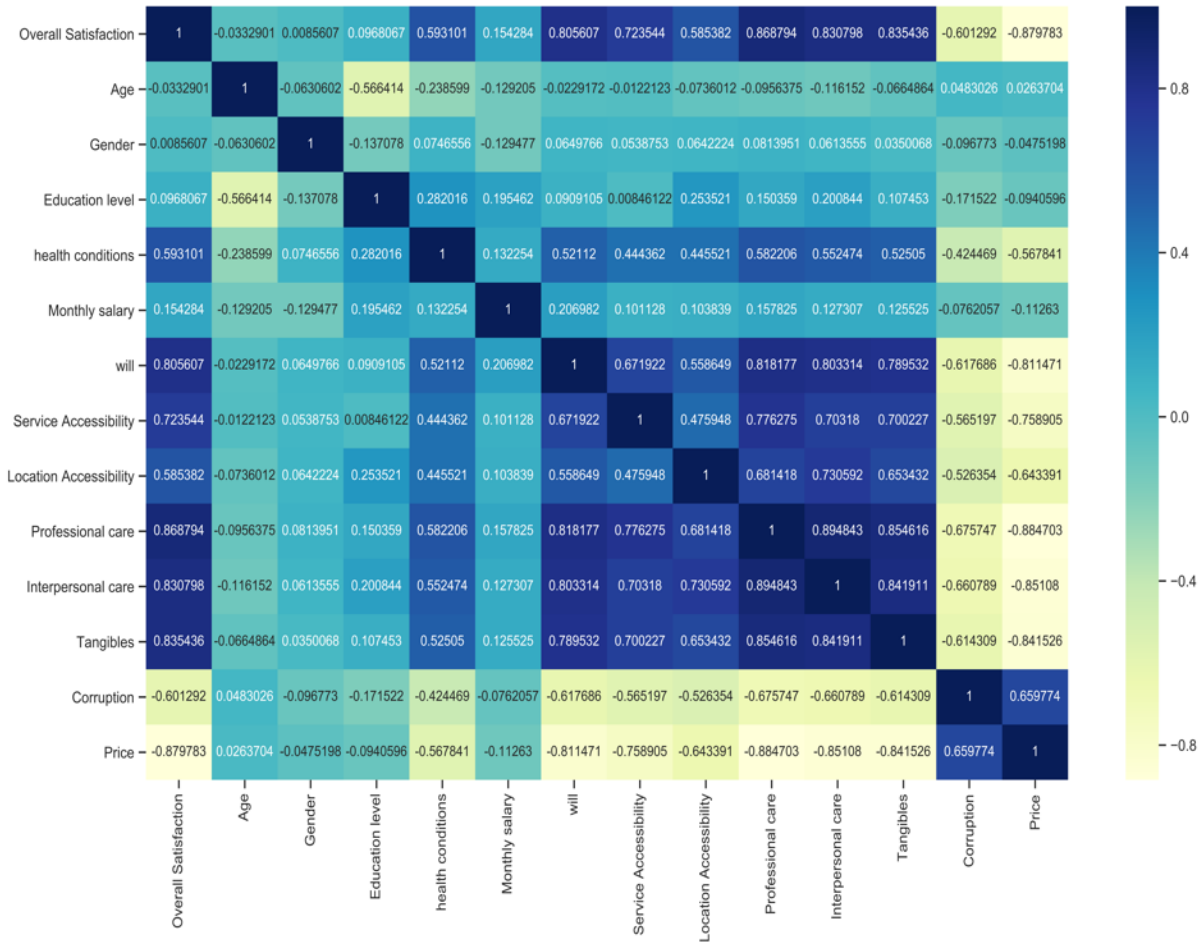
In order to explore the correlation between the target variable: overall satisfaction and other determinants, Pearson Correlation analysis has been conducted in this research. The reason why Pearson Correlation analysis is selected is simply because it is the most commonly used method. However, one potential drawback of it can be that it considers there is always a linear relationship, and for some models that do not have linear relationships, Pearson Correlation Analysis might not be applicable.

As can been witnesses in the following heatmap, positive and strong correlations are plotted in dark blue, while the negative and strong correlations are plotted in light yellow. Generally, perceived service quality shows the strongest positive correlation with satisfaction level, which indeed makes sense, because patients who are satisfied with the hospital must be pleasant with the service quality to some extent. Besides, interpersonal care and professional care also exhibit high positive correlation with overall satisfaction, meaning that provided with better care, patients are more likely to be satisfied. Furthermore, accessibility and tangibles come after the abovementioned variables, and they both show solid positive correlation with overall satisfaction.

On the contrary, price and corruption level instead displays negative correlation. Price factor shows stronger correlation than corruption, which can be indicated that price in the case hospital might be somehow overwhelming for patients. Regarding corruption level, it is moderately correlated with overall satisfaction with the score of roughly -6.01. It can be inferred that there are not many bribery cases occurring in the case hospital.

Lastly, regarding demographical variables, most of them exhibit low correlation score with overall satisfaction except for health conditions. Health conditions display a correlation score of 0.593, which can be perceived as a moderately positive correlation. The healthier the patients are, the higher satisfaction level they exhibit. Among all the variables, gender is seen as the least correlated item with overall satisfaction. Moreover, it is intriguing to see that age exhibits a negative correlation with satisfaction, meaning that older patients tend to be more dissatisfied with the case hospital, although the correlation is not strong.

Figure 9: Pearson correlation heatmap for all variables



5.4 Linear Regression analysis results

With the purpose to test all the hypotheses proposed in the previous chapter, linear regression analysis is conducted to find the significance for each variable and the relationship between each variable and overall satisfaction. In the following section, the results for linear regression analysis will be elaborated respectively.

5.4.1 Linear regression

Linear regression is conducted with Jupyter notebook with Python. The benefit of it is that significant variables will be marked with asterisk.

Based on the model summary, a high correlation can be witnessed due to the high R value (R=0.916). Additionally, the R squared value (R^2= 0.839) suggests that 83.9% of variation existing the satisfaction score could be explained by those independent variables.

In this linear regression model, all the potential variables are defined as independent variables, while overall satisfaction being the dependent variable. Significance level is determined by the P value. When P value is less than 0.05, the variable is considered significant. Moreover, the relationship will be determined by the coefficient. If the coefficient is above zero, a positive relationship is exhibited and vice versa.

Based on the results, the most significant variables are price, tangibles, professional care and health conditions with the p value of 0, 0.0004, 0.0005 and 0.0007 respectively. Furthermore, other significant variables consist of service accessibility and interpersonal care with the p value of 0.0120 and 0.0299. Thereby, it can be concluded that in linear regression model, accessibility, price, tangibles, professional care, interpersonal care and health conditions are affecting patients 'satisfaction level significantly.

In terms of the relationships between overall satisfaction and these significant variables, service accessibility shows positive relationship with overall satisfaction, while location accessibility shows negative relationship. Also, profession care exhibits positive relationship with patients' satisfaction. Additionally, tangibles aspect, being one of the most significant variables, is positively correlated with patients' satisfaction. Likewise, health condition is proved to be positively associated with patient's satisfaction. However, price shows negative relationship with overall satisfaction.

Table 7: Model summary for Linear regression model

Model Summary				
Model	R	R Squared	Adjusted R Squared	Mean squared error
Linear regression	0.916	0.839	0.831	0.187

Table 8: Linear regression results for all variables

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	2.3874	0.7426	3.2151	0.0015	.
Price	-0.4394	0.0720	-6.1037	0.0000	***
Tangibles	0.2436	0.0678	3.5908	0.0004	***
Professional care	0.3001	0.0845	3.5496	0.0005	***
Health conditions	0.0111	0.0032	3.4519	0.0007	***
Service Accessibility	0.0953	0.0377	-2.5288	0.0120	*
Interpersonal care	0.1580	0.0724	2.1833	0.0299	*
Gender	-0.1141	0.0720	-1.5847	0.1143	
Age	0.0039	0.0030	1.2863	0.1995	
Monthly Salary	0.0398	0.0373	1.0655	0.2877	
Corruption	-0.0363	0.0368	0.9857	0.3252	
Education Level	-0.0218	0.0451	-0.4845	0.6285	
Location Accessibility	-0.0255	0.0637	0.4001	0.6894	

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'0.1

5.5 Hypotheses testing

Based on the two models' results, the 10 hypotheses proposed in the previous chapter can be then evaluated. In the following section, the validation for each hypothesis will be illustrated.

H1: The perceived level of care is a significant predictor and is positively correlated with patient's satisfaction in the case hospital.

Based on the results from linear regression analysis, professional care is found out to be the significant predictor for patient's satisfaction. Nonetheless, for interpersonal care, the

significance level is relatively lower than that of professional care. Furthermore, a positive relationship can be seen for care in general in both models.

H2: The perceived accessibility is a significant determinant and is positively associated with patient's satisfaction in the case hospital.

Service accessibility is found out to be significant in the linear regression model, whereas, regarding location accessibility, it seems not to affect patients' satisfaction significantly. Besides, a positive relationship can be witnessed for service accessibility construct.

H3: Tangibles play a significant role in affecting patient's satisfaction in the case hospital.

Regarding tangibles, it is explored to be one of the nmost significant predictor for patient' satisfaction in linear regression analysis. Also, it is positively correlated with overall satisfaction.

H4: Price is a significant determinant and is inversely correlated with patient's satisfaction in the case hospital.

As for price, it is considered the most significant determinant in linear regression model according to the results. However, price dimension displays a negative relationship with overall satisfaction.

H5: Corruption level is the significant predictor for evaluating patient's satisfaction in the case hospital.

The results for corruption level are interesting. In linear regression model, no strong significance level is found for corruption. Besides, a negative relationship is discovered between corruption and overall satisfaction.

H6: Age is a significant determinant and is positively correlated with patient's satisfaction in the case hospital.

Regarding age, in linear regression analysis, it is not classified as one of the significant determinants. Besides, age is explored to have a positive relationship with overall satisfaction.

H7: Gender is a significant factor and male exhibits lower satisfaction scores than female does in the case hospital.

According to the results, gender does not seem to be a significant predictor for patient's satisfaction and the p value is mildly high. However, a negative coefficient between gender and overall satisfaction is detected.

H8: Education level is a significant determinant and is positively associated with patient's satisfaction in the case hospital

Likewise, education level tends not to be one of the significant factors for patient's satisfaction based on the outcomes and no stable relationship is found.

H9: Socio-economic status is a significant predictor and is positively associated with patient's satisfaction in the case hospital.

Socio-economic status in this research is measured by monthly salary of our respondents. In both models, monthly salary is situated in the middle of the chart, indicating that it is a mildly significant factor affecting patient's satisfaction. Besides, it displays a positive relationship with overall satisfaction.

H10: Health condition is a significant determinant and is positively correlated with patient's satisfaction in the case hospital.

Based on the results, health condition belongs to the most significant predictor group for patient's satisfaction, and the p value in both models are relatively close to 0.01, which can be interpreted as of high significance. Furthermore, a positive relationship is discovered between health condition and overall satisfaction in general.

5.6 Predictive analysis

To predict how willing patients are to return to the case hospital, decision tree and random forest models are deployed. In predictive analysis part, the willingness score is converted to binary value following the similar rule with overall satisfaction (Scores higher than 4 will be converted to 1 and the remains are categorized as 0). In the following part, results from the two models will be discussed and compared. Important variables affecting patients' willingness to return will be selected based on final outcomes. Besides, the sample is divided

into training and testing datasets with the ratio of 7:3, meaning the 70% of the sample data flow into training dataset and 30% of the sample data are fed into the testing dataset.

5.6.1 Decision tree

In decision tree model, classifier method is utilized to predict whether patients will return to the case hospital or not. After being trained by the training dataset, the model predicts the results based on the testing dataset, and the following confusion matrix is created. In light of the confusion matrix, it appears that the model performs just fine, and the overall accuracy is calculated as around 84.14%, which indicates that 84.14% of the responses are correctly predicted. In terms of the precision score, it is a rather high accuracy score, inferring that for all the patients who are willing to return, of whom 91.54% are correctly predicted as positive answers. However, the low specificity score (40%) highlights that this model poorly predicts the patients who are unwilling to return since only 40% of negative answers are predicted correctly.

Table 9: Confusion matrix for decision tree model

	Actual Positive	**Actual Negative**
Predicted Positive	65	7
Predicted Negative	6	4

Table 10: Performance Metrics for decision tree model

Metrics	**Accuracy**	**Precision**	**Sensitivity**	**Specificity**
Score	84.14%	91.54%	90.27%	40%

The following table displays the importance score for each item in a descending order. It is obvious that tangibles and professional care dimensions are on the top of the chart, making them the most two important variables that influence patients' willingness to return the case hospital. Furthermore, health conditions, service accessibility, price , age and interpersonal care dimensions are found to be of high importance as well. It is notable that gender, monthly salary, location accessibility, corruption level and education level do not seem to be important at all regarding if patients are willing to return or not.

Table 11: Importance chart for all variables for decision tree model

Item	Importance Score
Tangibles	0.361411
Professional care	0.254888
Health conditions	0.181138
Service Accessibility	0.086317
Price	0.040540
Age	0.039022
Interpersonal care	0.036685
Gender	0
Monthly Salary	0
Location Accessibility	0
Corruption	0
Education level	0

5.6.2 Random forest

For random forest model, it is also implementing classifier method to help predict patients' willingness to return. Based on the confusion matrix, the overall accuracy is around 85.36%, which is considerably higher than that of decision tree model. The high accuracy indicates that patients' willingness to return can be more accurately predicted based on their profiles. The reasons for the better performance are that more iterations have been tested in the random forest model and random features are selected to test the performance for each combination, while decision tree takes all features as inputs. Compared to decision tree mode, and precision score increases significantly from 91.54% to 97.18% . The rise in these metrics implies that random forest model is better at predicting the willingness to return than decision tree model.

Table 12: Confusion matrix for random forest model

	Actual Positive	Actual Negative
Predicted Positive	69	10
Predicted Negative	2	1

Table 13: Performance Metrics for random forest model

Metrics	Accuracy	Precision	Sensitivity	Specificity
Score	85.36%	97.18%	87.34%	33.33%

In regards with the importance chart below, some variations emerge compared to the results of decision tree model. Despite the differences, tangibles, health conditions, service accessibility ,professional and interpersonal care and price are found to have great importance in random forest model, which align with the results of decision tree model. Corruption is of moderate significance to patients' willingness to return based on the results. Nevertheless, compared decision tree, random forest model rates age dimension a low significance score, whereas, age dimension is placed at the middle part of the importance chart in decision tree model. Furthermore, it is notable that some of the demographic items are discovered to have low importance in random forest model: monthly salary, education level and gender.

Table 14: Importance chart for all variables for random forest model

Item	Importance Score
Tangibles	0.30535
health conditions	0.13426
Service Accessibility	0.10942
Professional care	0.10708
Price	0.09886
Interpersonal care	0.08438
Corruption	0.05612
Location Accessibility	0.04481
Age	0.02726
Monthly salary	0.01203
Gender	0.01032
Education level	0.01011

6 Discussions

In this chapter, discussions for the results will be elaborated. First, I will focus on the analysis of hospital related predictors. Then, demographic factors' results will be thoroughly analyzed as well. Lastly, emphasis will be put on the prediction for patients' willingness to return to the case hospital.

6.1 Care

Based on the results, professional care shows great importance to patients' satisfaction, and interpersonal care is of moderate importance. The outcomes are in line with Andaleeb (2001)'s research results. In general, the four items from professional care all reflect on how hospital personnel are capable of handling patients and providing reliable treatment for patients. The high average score (around 5.5 out of 7) for the four items indicate that patients are highly satisfied with the professional care aspect of the case hospital. Although there are not many specialists in the case hospital due to uneven distribution of health resources, the hospital personnel have at least achieved required basic medical related education and gone through all the necessary trainings in order to be on board and to provide services to patients.

In terms of interpersonal care, in spite of the lower significance level, it does not necessarily refer that the level of interpersonal care does not meet patient's expectations. From the responses, it can be seen that the scores for those items are relatively high, which are on average 5.1. It means that patients are satisfied with interpersonal care that they receive in the case hospital. The reason for the low importance score can be that patients do not think the level of interpersonal care affects their satisfaction towards the case hospital, because they are pleasant about it.

From another perspective, it can be indicated that some patients rating high satisfaction scores are not satisfied with the level of interpersonal care in the case hospital. According to the responses, older patients tend to give low scores for the interpersonal care and especially for communication aspect. It can be explained that it is more difficult to communicate with older patients, because they have difficulty in comprehending specific terms regarding diagnosis and treatment. Besides, they are not able to express their problems and needs clearly and concisely due to impaired hearing ability and poor health conditions.

6.2 Tangibles

In light of the results from the previous section, tangibles is considered as one of the most significant determinants for patients' satisfaction. According to Camgöz-Akdag & Zineldin (2010)'s study, it concludes that tangibles are of high importance to patients' satisfaction in general. However, in this research, the result is more specific to the aspect of lacking medical equipment. Item 4 from tangibles mainly reflects on the medical equipment aspect, others more focus on the level of cleanliness of the case hospital and hospital personnel's tidiness.

Based on the responses from the patients, the average score for item 4 is only around 4.24, which is a rather moderate score. It somehow indicates that patients are not showing high satisfaction towards the amount of medical equipment that the case hospital currently owns. The result is actually in line with the case hospital's current situation. Since the local government allocates less resources to hospital in rural areas and the number of patient's visits is not enough compared to hospitals in urban areas, the case hospital cannot afford to purchase more and advanced medical equipment. Therefore, when patients are in need of a specific new medical equipment for diagnosis and treatment, they often need to be transferred to a higher-level hospital in the city. This as a result leads to dissatisfaction for patients who need advanced medical equipment.

The scores for other items from tangibles are more satisfactory, indicating that patients are pleasant with the clean environment, little noise and tidy hospital personnel in the case hospital. Generally, cleaning staff will perform cleaning services in the premise twice per day according to the director of the case hospital's statement. Furthermore, signs about keeping voice down and being quiet in certain areas are placed clearly to prevent noise from patients and hospital personnel. These actions ensure that a comfortable and cozy environment for patients.

6.3 Accessibility

Accessibility can be categorized into physical accessibility and service accessibility. In this research, both dimensions of accessibility are measured with corresponding questions. Based on the results, service accessibility is considered to be the significant determinant for patients' satisfaction. The average score for service accessibility item 1 is around 5.4, which is relatively high. It refers that patients are satisfied with the quick service that they receive when they need help. Due to the low number of patient's visits daily, patients do not need to

wait for a long time for an appointment, which in turn increases patients' satisfaction regarding waiting time. Besides, hospital personnel are also able to provide swift services when patients have problems or questions.

The item 3, however, shows a lower average score, which is around 4.2. It infers that the current service time does not meet patients' expectations, leading to lower satisfaction scores ultimately. According to the statement from the case hospital, the average service time for each patient is approximately 25 minutes, including diagnosing, answering patients' questions, giving treatment plan and instructions for further care. Theoretically, due to less patients' visits, doctors are able to lengthen the service time, nevertheless, the reality does not seem to be the case. It can be explained that doctors think having short clinical sessions where everything is covered is more efficient and saves more time for them to go through documenting process as well as to handle other paperwork. On the contrary, for patients, their perceptions are completely the opposite. They think that longer clinical sessions help them understand their health problems more thoroughly and solve their enquiries.

The location accessibility construct reflects the waiting time and location convenience. As mentioned above, the waiting time is not too long in the case hospital due to low patients' visits. Therefore, most of the patients are satisfied with the current waiting time with an average score of 5.23 in general. Regarding location, as the case hospital in located in a small town, it is relative convenient for residents to reach the case hospital within an acceptable time range. Thus, more positive feedback is provided by patients regarding location convenience.

6.4 Price

Regression results show that price is an important determinant for patients' satisfaction. Besides, a negative correlation is found between price dimension and patients' satisfaction. The results align with most of the previously discussed literatures, such as Xiao & Barber (2008)'s study. The three price related survey questions all reflect the price dimension but with different presentations. The format of first two questions is more straightforward, while the third one asks about price in a more euphemistic way.

In terms of the average score, question 1 and 2 related to price construct have an average score of around 4.98, which can be interpreted that patients are slightly satisfied with the service price in the case hospital. Typically, local government subsidizes rural hospitals and general service prices in rural hospitals are kept at a relatively low level with

the purpose to make the service more affordable to rural residents. However, not all services are compensated by the local government; For some high-tech services, such as X-ray and ultrasonic services, the price can be a bit higher than normal services for hospitals to make profits. Therefore, patients might not be pleasant with the high price for high-tech services. Moreover, some doctors prescribe unnecessary medicine to patients for rebates from pharmacies, which is a common phenomenon in rural towns, as the salary for hospital personnel is quite low. Due to these factors, patients can sometimes feel that they are overcharged for services or medicines.

For price 3, it describes if patients would still come to the case hospital given that they are not wealthy. The average score for this question is 5.20, indicating that for poor residents, the chances for them to visit the case hospital is moderately high. Likewise, it can be explained by the high price for some services. Additionally, as there are only two public hospitals in this town, and the case hospital is the largest one in size, the choices left for local residents are limited. Local residents can only visit the case hospital if they seek for better service and do not want to travel far to larger cities. Thus, it explains the high score for price 3 question.

6.5 Corruption level

It is attention-grabbing that corruption level is not seen as a significant determinant for patients' satisfaction in linear regression analysis, and it is found that corruption level is negatively associated with patients' satisfaction. For the two questions, they both measure the corruption aspect. However, the first one is formulated in a periphrastic way, stating that patients think doctors will not perform good services if they do not tip. The second question is more direct, describing that patients think doctors expect to receive tips.

The average score for corruption 1 is 3.16, while for corruption 2 is 2.78. It refers that patients agree with statement 1 more than statement 2. Because most Chinese prefer answering questions which are formulated in a euphemistic way, for straightforward questions, they are unlikely to give trustworthy results reflecting their minds. By virtue of the personal attribute, it is reasonable for patients to less hold with statement 2.

The phenomenon of tipping or giving red pockets to doctors used to be extremely prevalent in China, especially in developed cities where there are more specialists. Nowadays, owing to government's harsh supervision and regulation, corruption activities are experiencing a declining trend. Nonetheless, for rural places where government

supervision is limited and residents are less likely to report, corruption activities still exist and cannot be ignored. Although the average score for corruption is not significantly high in the case hospital, it can still be shown that corruption activities exist and patients are not satisfied with it. Typically, in terms of corruption activities in rural places, it includes paying more for faster service, asking for extra medicine, requiring specialists from larger cities to conduct surgery locally and giving gifts for better service.

6.6 Demographical determinants

Among the five demographical determinants, age and health conditions are considered as significant ones based on the regression results, while gender, education level and socio-economic status display a rather low significance level. Compared to the previous studies, the results for demographical determinants differ significant from earlier researches, as they conclude that other three dimensions impact patients' satisfaction significantly as well. The deviation can be explained by the difference in case hospital and target respondents.

In terms of age, it shows slight importance in logistic regression analysis. For linear regression, it is extremely close to the threshold for being significant to patients' satisfaction. Besides, a positive relationship is discovered between age and patients' satisfaction level, indicating that older patients demonstrate higher satisfaction scores. According to the descriptive statistics, the average age of the respondents is around 44. Also, most of the respondents' age is in the range from 40 to 70. In accordance with Fan et al. (2005)' studies, younger patients tend to show more dissatisfaction towards the case hospital's service, while elder patients showing the opposite.

Usually in rural towns, local population has an aging tendency since young generate mostly moves to urban cities where there are better resources for work and studies. The remaining ones are mainly elders with limited education background. Therefore, in the case hospital, for young patients, comparing the case hospital to other hospitals in large cities which they have visited, they think their expectations are not reached and the overall quality of service and physical environment in the case hospital are relatively poor. Thus, lower satisfaction level can be anticipated from young patients. On the contrary, older patients who live in this town do not have a wide selection of hospitals. Moreover, it is less frequent for them to visit hospitals in modern cities. Therefore, they are content with the case hospital in general.

Regarding gender, it shows low significance level in both regression analysis. The number of male respondents is slightly higher than that of female respondents. According to the negative coefficients from both analyses, it indicates that male patients are more likely to be satisfied with the case hospital. However, it cannot be concluded that it is a clear pattern applicable for all future cases. The reason why male patients display higher satisfaction score can simply be the larger number of male respondents, which should not be representative.

As for education level, it can been seen in the descriptive statistics that majority of respondents holds a degree below university degree and the average is high school degree. Nonetheless, the low education level does not impact satisfaction of the target respondents significantly. Based on Sitzia & Wood (1997) implication, it notes that literate patients show higher satisfaction and education level is a significant determinant for patients' satisfaction. In this research, although most of the respondents have low education level, the average satisfaction score does not look bad.

Similarly, social-economic status is not considered important for the case hospital. In most towns, local residents' social-economic status is not high, which is reflected in this research. The average monthly salary for the respondents is approximately 3000-4000 RMB. Optimally, social-economic status should be highly correlated with the price aspect. As price is considered significant to patients' satisfaction for this case hospital, it is unexpected that same logic does not apply to social-economic status dimension. However, by evaluating the significance score, it is very close to the threshold for being significant. Therefore, in further research, using parameter tuning and other measures, the results might change enormously.¨

The last dimension from demographical determinants, health conditions, shows great importance in both model results, which is also in line with Jackson et al. (2001)'s study. Generally, most respondents perceive themselves in fair health condition, which can be demonstrated in the descriptive statistics with the scores above 70.

6.7 Willingness to return

In order to predict patients' willingness to return, two models: decision tree and random forest are deployed. According to the performance metrics, random forest model displays higher accuracy score than decision tree. Besides, based on the results, the following dimensions are assessed as the significant predictors for patients' willingness to return: Professional care, tangibles with focus on medical equipment and noise level, location accessibility, health conditions and age.

The high importance score for professional care implies that patients extremely care about if hospital staff are able to deliver professional service. In the case hospital, although doctors and nurses are well trained and educated before onboarding, the number of specialists and experts is very limited. Therefore, when diagnosed with serious diseases, most local residents prefer to choose hospitals in large cities where there are abundant health resources and experts who can treat them. This phenomenon considerably undermines patients' willingness to return to the case hospital. Likewise, the lack of medical equipment in the case hospital turns out to be the significant predictor as well. For diagnosing and treating patients, some specific medical equipment might be required. If the case hospital is not well equipped with necessary medical equipment, patients are less likely to return.

Regarding noise level from tangibles' aspect, as the case hospital is located near the main road, where many cars and motorbikes pass frequently, it can be annoying for patients to endure such noise. Moreover, it is common that parents bring their children to the case hospital and noise from children can irritate patients sometimes. Thus, high noise level in the case hospital can thwart patients from returning. It is noteworthy that location accessibility is shown as an important predictor as well. However, in fact, the case hospital is situated in the center of the town. It should not be inconvenient for local residents to reach. One possible explanation can be that there are no good quality hospitals in nearby small towns, so local residents might travel to this town for treatment.

7 Conclusion

In this chapter, managerial implications for the case hospital will be presented based on the results above. Additionally, limitations and future research possibilities for this thesis will be discussed.

7.1 Managerial implications for the case hospital

It is crucial for the case hospital to be fully aware of what weaknesses are in the current managerial system and what needs to be improved accordingly. Thereby, based on the results from this research, several suggestions are produced with the aim to enhance patients' satisfaction and clinical experience in general.

First, hospital personnel should be well trained and cultivated with regards to professional knowledge and expertise. By providing professional service, the case hospital will be able to gain high satisfaction from patients as well as to increase the chances for patients to return. Besides, doctors and nurses need to be equipped with professional attitude. When diagnosing and treating patients, it is essential to get a comprehensive understanding of the patient by carefully browsing the patient's health history. Additionally, elaborating the treatment plan and instructions for taking medicine are of high importance too. Regarding the recruitment of hospital personnel in the future, the case hospital has to carefully go through the candidate's professional aspect.

Second, attention needs to be paid to service accessibility primarily. According to results, patients seem not to be contented with the current service time. From the perspective of patients, they consider long service session beneficial for them to have comprehensive treatment or clarification of illness. However, for some doctors, they might favor having a short service session, which leaves more free time for them to handle personal things and to document patients' files. Thus, it could be necessary for doctors to lengthen current service time proposed by patients in order to boost satisfaction score. Also, detailed explanation on why short session is better can be told to patients if lengthening service time is not approved.

Furthermore, price is an extremely sensitive factor for patients as most respondents do not have high monthly income. However, the case hospital is not capable of taking actions to entirely eliminate the problem, since the main power of setting price belongs to local government. The government is able to set the reimbursement threshold for NRCMS and adjust the price of medicine what is sold in the hospital. Hence, the only way to reduce the

financial burden on patients is to propose reduction on health care costs to local government. Additionally, the case hospital can adjust the service price for high-tech medical equipment.

Lastly, the results show a moderate level of corruption activities in the case hospital, which results the drop in satisfaction. Typically, “red pockets” (money or gifts) are given to doctors in exchange for quick and better service. This kind of activity significantly deteriorates the reputation of the hospital and escalates the financial burden on patients, as they think doctors might perform bad services if no “red pockets” are provided for doctors. For solving this problem, it is critical to establish a stricter supervision mechanism in the case hospital to monitor corruption activities as well as to encourage patients to report the activity if they witness it. Moreover, internal education can be performed for all hospital personnel to raise the awareness of not receiving money or gifts from patients, otherwise there will be punishments for corruption activities.

7.2 Limitations and Future research possibilities

For this research, there are a few limitations weakening the accuracy of the results. First, the data points for machine learning models are far from enough. Typically, machine learning models generate more accurate results when being fed with more data. In this case, the responses collected are only 283 copies and after filtering our invalid ones, the valid data for machine learning models are 271 records. Furthermore, the dataset is divided into training and testing sets with a ratio of 7:3, therefore there is not enough data to validate the accuracy of two models. Consequently, the problem of lacking data leads to the typical overfitting problem in machine learning. The high accuracy (86.6%) in random forest model might not be representative, since the training dataset is far from enough. It implies that the model has not learned enough from the given dataset, resulting an extremely simple training model. In future research, more responses can be collected in order to train the model better and eliminate the problem of underfitting.

The second limitation can be the large amount of variables which are input in the models. It is undoubtedly beneficial to discover every possible significant determinant and predictor for patients’ satisfaction and willingness to return by using all variables. However, there are both necessary and redundant variables. The redundant variables can significantly deteriorating the models by lowering the accuracy level. Therefore, it is crucial to filter out redundant variables and keep only necessary ones. For future research, feature selection could be implemented for the machine learning models to select important variables.

Lacking parameter tuning can be the third limitation in this research. Especially for random forest model, as Scikit-Learn package is used and there are many parameters could be tuned in this model, the accuracy score can be rather low if no actions are done for adjusting important parameters. For instance, the number of estimators, minimum number of samples needed for splitting a node and maximum depth of the tree can be considered as necessary parameters to be tuned. Thus, in future research, hyperparameter tuning needs to be deployed in order to increase the accuracy for random forest model.

Lastly, more possible determinants should be included in this research. Currently, there are only 10 determinants selected for analysis, which can be insufficient. With more possible factors, the results can be more comprehensive since more aspects that affect patients' satisfaction are covered. For instance, job type, marital status, communication style that doctors use and reputation of the hospital can be also included as potential significant determinants in future research.

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Appendix A: Survey

Dear Respondents,

I'm a student from Aalto University School of Business conducting a survey for my Master Thesis. The purpose of this study is to collect data in order to discover significant determinants of patients' satisfaction and predicting the willingness to return for Shahu Central Hospital. By participating this survey, you will contribute your current knowledge to this area and help Shahu Central hospital improve the overall experience and satisfaction level for patients. Thus, your participation in this project is very significant.

If you choose to participate, you will be required to complete one set of questionnaire, and it will take approximately 5 minutes. I appreciate your willingness to participate in this survey.

All information collected from the survey will remain private, confidential and anonymous. Besides, no identification information will be collected. The finding of this survey will only be used for academic purpose. Your support would undoubtedly provide me with more insights to my thesis project.

Thank you for your cooperation!

1. How satisfied are you with Shahu Central Hospital? (0-7)
2. How satisfied are you with the service provided by Shahu Central Hospital? (0-7)
3. To what extent do you agree with the following statements?

	Strongly disagree						**Strongly Agree**
1. When I need help, hospital personnel can respond without delays.	1	2	3	4	5	6	7
2. I have to wait for a long time for a doctor's appointment.	1	2	3	4	5	6	7
3. When performing examinations, I do not think doctors have done in a carefully and professionally way.	1	2	3	4	5	6	7
4. I think the current service time for a doctor should be lengthened.	1	2	3	4	5	6	7
5. If I do not tip doctors, I do not think they will provide professional and good service to me.	1	2	3	4	5	6	7
6. The hospital is very clean in general.	1	2	3	4	5	6	7
7. Doctors always treat me with respect.	1	2	3	4	5	6	7
8. For some services, I think the prices for them are a bit overwhelming.	1	2	3	4	5	6	7
9. The hospital personnel have a clean appearance.	1	2	3	4	5	6	7
10. When prescribing medicine to me, doctors always explain the instructions and side effects to me clearly.	1	2	3	4	5	6	7
11. I do not feel there is excessive noise in the hospital when I visit the hospital.	1	2	3	4	5	6	7
12. The medical equipment in the case hospital is not enough.	1	2	3	4	5	6	7
13. I think the price here is reasonable for the service provided in the case hospital.	1	2	3	4	5	6	7

14. Doctors do their best to alleviate my worries about my health.	1	2	3	4	5	6	7
15. Even if I am not wealthy, I am still willing to visit the case hospital.	1	2	3	4	5	6	7
16. Hospital personnel have sufficient knowledge to solve my questions.	1	2	3	4	5	6	7
17. Doctors ask about my symptoms and health conditions in details.	1	2	3	4	5	6	7
18. It is convenient to reach the case hospital.	1	2	3	4	5	6	7
19. I think doctors expect to receive tips.	1	2	3	4	5	6	7
20. Hospital personnel are willing to answer questions patiently.	1	2	3	4	5	6	7

4. What is your age? (E.g. 22)
5. What is your gender?

   Male Female Prefer not to say
6. What is your highest degree achieved?
   1. Primary school
   2. Middle school
   3. High school
   4. Bachelor's degree
   5. Master's degree
   6. Doctoral degree
7. What is your current health condition? (0-100)
8. What is your monthly salary?
   1. Under 2000 RMB
   2. 3000-5000 RMB
   3. 5000-7000 RMB
   4. 7000-10000 RMB
   5. Above 10000 RMB
9. If needed, how willing are you to return to the case hospital in the future? (0-8)

Thank you for your time!